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PROCEEDINGS FROM THE

EIGHTH

INFORMATION TECHNOLOGY CONFERENCE

MAY 16 & 17, 1990

PROVINCE OF NEW BRUNSWICK
FREDERICTON

91-00574/

NEW BRUNSWICK GOVERNMENT
INFORMATION TECHNOLOGY CONFERENCE
MAY 16, 1990

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INFORMATION TECHNOLOGY CONFERENCE

WELCOME

By David Cowperthwaite

Conference Chairperson

Welcome to the Government Information Technology Conference. This is the eighth conference, sponsored by Supply & Services, and I'm pleased to say, we have the largest attendance of any conference to date. We have a full agenda for you for the next two day. The theme for day one is New Brunswick Government's Information Technology Strategy as it has been adopted by Board of Management.

Today we will have presentations from Central Agencies responsible for much of our information technology for Department of Supply and Services. We will hear from key players in the implementation of this strategy, the information technology strategy Steering Committee, and the Chief Information Resource Officer, who will share the experience of the Department of Agriculture in following a requirement of the strategy, specifically the Strategic Information Plan and then we will have three presentations on projects, established to implement the connectivity and data sharing that is called for by the strategy.

We will also take a look to the future this afternoon where the presentations should be of wide-spread interest, that being the developing world of Computer Assisted Translation.

Our theme for day two of the conference is Geographic Information Systems or GIS. To many of us, GIS represents a great mystery with a potentially large price tag. Tomorrow we will stay away from the technicalities and try to look at how GIS can be used to solve real problems that we face today. We will examine the formal structure of GIS in government and review it's development in New Brunswick. In the afternoon, we'll have some practical examples of current and future applications of this technology by four New Brunswick government departments. The understanding we gave them is that the presentations will make it much easier for all of us to buy into the GIS investment.

This conference was organized by representatives of three departments, and I'd like to introduce the committee members now. Standing at the back, tuning the microphones, is Gary Fraser, Department of Commerce and Technology. Our other person who participated in the organization is Serge Maillet from Department of Supply and Services, and I believe Serge is unable to be with us this morning, and hoping to join us a little later in the conference.

Our committee held a lot of meetings and we made a few decisions, but I've got to be honest with you and tell you the real work was done by three people of Supply and Services that I'd like to introduce. Again, at the back is Myrna Tweedie who kept us on track through the whole organizational process. Brenda Colpitts, who kept the paper work in order for all that we have done, and Margo Fisher who you met this morning at registration.

If you have any questions or concerns during the conference, any of us would be pleased to assist you.

A couple of administrative details, important things first, coffee is scheduled for 10:15 a.m. and 3:00 a.m. and will be served in this room. Lunch will be provided as usual at 12:15 p.m. today. We have a slight change in procedure. We would ask that you pick up a ticket for lunch as you leave the morning sessions and the hotel staff will be collecting these tickets when you enter the restaurant.

With all of that being said, I'd like to introduce our first speaker of the morning, Mr. Max Lewis, Deputy Minister of Supply & Services.

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 16, 1990

INTRODUCTION TO THE CONFERENCE

by

Max Lewis
Deputy Minister
Department of Supply and Services

Good morning, ladies and gentlemen.

I appreciate the opportunity to welcome all of you to this **8th INFORMATION TECHNOLOGY Conference.**

As you already know, this intra government gathering is specially focussed on the material, subjects and content which are of interest to those within the government community, who are engaged in the businesses of....

"making Information Systems Technology work for government"...

It is especially gratifying for us at SUPPLY and SERVICES to be involved as a sponsor for this gathering, and even more gratifying to be aware of the amount of interdepartmental effort and co-operation which goes into the preparation of these conferences.

As is the case with computer technology itself, these conferences have evolved considerably in their format and attendance.

The presence, involvement and interest of Deputy Ministers; as the senior executives in departments; in the strategic aspects and opportunities of applying computer technology to the various forms of government business, is essential if we are to maximize the benefits of working together.

The evidence of this degree of interest and involvement is reflected not only by the participation of my colleagues here this morning, but also by the content of the agenda for this particular conference. The morning's content will surely leave you with the impression that the Deputy Ministers of this government are interested, active and supportive of the idea of ...

"working co-operatively ...to make technology work"

The underlying theme, and the specific agenda contents for this conference were selected by the conference organizing committee because they represent subject areas which will be critical to administrative success...with economic benefit...for both the government community and for the private sector suppliers who deal in providing technology services.

The primary emphasis is on focussing **INFORMATION TECHNOLOGY** for "corporate", or government-wide benefit. I believe that the following speakers, their subjects and the content of their messages will convey the emphasis on the necessity to think and act in a cooperative manner when it comes to the application and implementation of computer technology. Benefits applied across the entire network, provide far greater impact than isolated pockets of technology, and tend to improve not only our administrative cost/efficiency ratios, but also significantly improve our services to the general tax-paying public of this Province.

While I do not wish to detract from the messages of any of the speakers who follow, particularly Jerrie and John who follow immediately, I do have the benefit of saying a few things early...and then adding

remember where you heard it first!

I do not believe that I could overemphasize the benefits of working together, and in harmony, for the benefit of the overall government administration. The Department of Supply and Services is in the business of delivering the commodities of technology, and managing the facilities required. We are also in the business with a distinct emphasis on **SERVICE** and our structure is currently being changed, and will continue to evolve as our role does with the emphasis on providing the best possible service.

The function of our *Marketing Services* unit, and the feedback received from their conversations with departmental personnel, are taken very seriously within DSS. I do keep abreast of those communications, and am aware of where issues and concerns arise. The brochure which has just been distributed at this conference is intended to convey the message of our "service orientation", to do so in a manner that reflects "professionalism", and to quickly convey the variety and range of technology services that we offer.

For a moment I would like to comment on the subject of the evolution of technology...and of the type of thinking behind that evolution.

For years, and when I was in the programming and systems development world, the most predominant emphasis was on
"maximizing the cycles"..machine efficiency if you will and not much discussion of where those cycles were located, later there was endless debate as to whether it was more effective to have "centralized" computing capacity, or "decentralized" capacity. The pendulum was always swinging ...or said to be swinging, from one side to the other.

We continue to hear mainframe v/s mini debates, mini v/s networked micro debates In the name of efficiency and effectiveness, we need to have these debates, however, to the engineer dealing with construction project information or the nurse dealing with a patient, I suspect they really don't care. What they want is the best, most accurate, timely information possible made available in the most convenient way.

I suspect in the future, we may not even be able to isolate the source of the data as through networks and integrated systems it may come from several machine platforms.

It is my view, from what I have heard and have been reading, that the emphasis is no longer on **How Many Cycles** and **Where**, but on maximizing the strategic use of technology to obtain the information required to effectively operate your business.

This strategic emphasis, by necessity involves the senior executives of an organization, and by necessity requires that considerable effort be placed upon

- understanding what technical options exist;
- dealing with common needs;
- dispersing the accessibility to computing tools and data;
- accommodating the specific needs of users with commonality in mind;

and

- building the technical architecture of the environment such that a variety of services and facilities are available.

The issue is no longer one of choosing one option over the other, but rather one of choosing the collection of options that provide the required elements of the NETWORK as we move to a more open and integrated systems environment.

There are frequent articles and discussions as to whether the capacity and cycles represented by the Mainframe computers are a dying breed...like dinosaurs.

I am of the view that computers period are becoming more significant in the business of government, and the distinction between computers is becoming less apparent ...with the significantly growing capability of microcomputers, minicomputers...who can really tell the difference anymore by those terms alone? As an example, at NB Liquor Corp. they utilize a Dec. Vax machine as their corporate computer (mainframe), while others would consider this machine a departmental or mini computer.

Obviously it is what computers are being used for that is important, and how they are being used that must be carefully thought out...size alone is not the overriding factor.

Our existing *mainframe* computers continue to have an important role in the **government's computing network**, particularly with respect to corporate systems and data, and this role will evolve and change as the required services demand.

Existing departmental computers, whether those are so-called MINI'S or MICRO'S will also continue to evolve in the network of technical services administration, but our objective is to ensure that individual processing needs are served on the appropriate platforms, in the appropriate manner, and that as much interchange of data, program logic and technical support is available as is possible.

In closing, I would like to say that it is most encouraging to see the number of participants present this morning. I understand from David that this is in fact the largest attendance ever at one of these conferences.

I thank the planning and organizing committee for their efforts and I believe that the agenda and representation of topics and speakers will hold your interest for the full two days and will prove to be of benefit to all of us.

Thank you.

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 16, 1990

SERVICES UPDATE, INFORMATION SERVICES GROUP

by

Jerrie Fowler
Assistant Deputy Minister
Department of Supply and Services

I too, am about the same age as Bob and Max, and back in the early days, I wasn't a systems person I was one of the disgruntled users, always thinking I could do their job a lot better than they could. Now that I have the responsibility for the systems group, I have taken a slightly different perspective, of course, I guess your viewpoint always depends on where you sit.

The agenda indicates that I'm supposed to give a Services Update, and I'm not sure I know what that really means. I asked someone and they told me that maybe I could get a copy of the Department of Supply and Services Annual Report and use that as a basis, but I always thought that the only people who ever read annual reports were the people that wrote them, and the odd member of the public accounts committee looking for some material with which he could embarrass the department. I think I would bore everyone to death, and probably will with the material I've got but I think I will stay away from the Department of Supply and Services Annual Report, that basically tells everyone what great people we are.

I would like to, however, review some of the activities that have gone on over the last year, and spend some time talking about the future. In particular, where I envisage the role of the information systems group in the future, and the future of information technology. If you'll bear with me, I'd like talk a little about what has gone on in the department of Supply and Services in the last year in the Information Systems Group.

There are three basic groups in the Informations Systems Group and I will include the Communications Group there which incorporates the Translation Services, the Queen's Printer Publishing Services and Mail Services, etc. That too is being impacted by technology and the technologies in that area are rapidly coming together with the technologies that exist in the computer services area. The electronic transmission of text is being set up for the Translation Bureau, so that people can transmit Text electronically to the Translation Bureau, and receive it electronically. It is a micro based system, and we are doing the testing on it now. I have been given to understand that the testing should be done by the end of this month, and hopefully we will be able to hook up every user by the first of July. We are a little behind schedule,but we have had some technical problems with the hard wiring, and I understand those are mostly resolved, so we should be up and running by the first of July.

The next step in that process, of course, is to look at the Queen's Printer area so that we can provide the same level of service there. We hope to reach the point where text can be transmitted easily across the organization without any rekeying.

We have recently conducted an operations review of our printing area. We received a very detailed report which I really haven't had time to digest as yet. But, basically, what we are looking at is the whole printing area and how it might be improved and how we might make better use of the private sector, improving the turnaround and quality of the printed material received by our clients. We are also looking at automated mailing lists in our mail room so we can maintain large mialing lists for clients and mail out the material to their clients in an easier fashion.

We have automated our inquiry services, and as most of you perhaps know, we have an inquiry service where anyone in the public can call in and receive information on various department activities or programs across government. We try to be the first line of contact, and of course when we can't answer the problems we refer them on to someone in a department that can. We have automated the basically standard reply, because many of the requests coming in are routine. The people fielding those inquiries can now just dial up on a micro computer a particular subject matter, and as a result of that, we have been able to answer a far higher number of inquires coming in without having to refer them to a second party.

We have recently introduced a workstation in our forms design area which gives us the capability of utilizing the computer for our forms designs work. We were somewhat automated before, but like all workstations this one is bigger and better and gives us considerable more flexibility.

In looking at the Computerized Translation, and as a word processing tool. Computerized translation has a long way to go, as y ou will hear this afternoon. It is applicable to things like manuals and those areas where the language is a bit more precise, but we're also looking into micros as a tool for translators and eventually we hope to equip all translators in our translation bureau with micro computers because with word processing, area network communications and then with the data communications productivity tool, perhaps increasing the individual productivity of a translator by as much as 15-20%.

In the Systems and Technology area there have been a number of activities in the last year. As you know, we've set up a consulting services group. Their primary responsibility to date has been Strategic Information Plans, and I think at this point in time we have done or have been involved in about seven different department's, assisting and developing strategic business plans, and strategic information plans. We've also chosen a standard methodology, with a lot of input from all departments, which we hope will be used as the Systems Development Methodology, and of course as a result of that exercise we have chosen Productivity Plus. We are in the process now of training people in it's use, and hopefully sometime in the next twelve months it will be adopted as the government standard and then we'll all be using it.

We're still continuing in the area of micro acquisition, preparing and evaluating government micro tenders. This includes employee computers and I understand that that has now been approved and information has been circulated to departments.

We have tried to become more client orientated and getting systems people more oriented to the needs and requirements of our clients. I believe we have been relatively successful in doing that. We have concentrated a lot on technology training, many of you probably have taken courses in the Access Centre on wordprocessing tools, and spreadsheet tools. To date, it has been a micro based training centre, but hopefully, as we go on, we will be expanding that, again depending on the needs and wants of the client community.

One of the other activities that has gone on in this area, is a UNIX review. We have prepared an updated report on where UNIX is currently at and where it is going. We have done some assessment on the mainframe environment to upload and download to UNIX boxes and we're also doing assessments on micro based UNIX software.

The third division of the Information Systems Group is the Data Centre itself. There has been a lot of activity going on in the Data Centre. We've recently gone through an operating software upgrade, and of course as many of you know, we did have some technical problems in that upgrade. I apologize for some of the delays and the poor response time during that process; however, it was a necessary upgrade, and that has allowed us to be in a position to put on relational software and more end-user tools.

We are now in the process of looking at a number of products. One of the products we are looking at is LINC. LINC was essentially a Burroughs product which has now been converted to run on their Sperry equivalent in the UNISYS world. Our initial review of that product, indicates it is good as an end-user tool and also as a programmer productivity tool. In fact, it is being considered at this point in time as the programming tool for the Payroll Personnel System.

We have spent a fair amount of time looking at local area networks. I attended a conference in the Eastern U.S. and almost all attendees agreed the competition between minis and LANS is over - minicomputers have won. Mini computers will essentially become file servers in a world of local area networks. I'm sure that debate will still go on. Because the people at that conference reached that conclusion doesn't necessarily mean that's it is so, however, I think it gives an indication of the rapid emergence of local area networks. We have spent a fair amount of time reviewing LANS evaluating them with various pieces of software. We believe it represents perhaps the ultimate platform for developing a government-wide electronic mail system. I'm not sure that we've reached any conclusions from our review other than there are lot of tools available, and many of them still need some improvement. We're hopeful at some time over the next twelve months we will be able to find some sort of a solution that will provide us with a government-wide electronic mail system.

We have also introduced a laser printer in our Data Centre. It offers a number of distinct advantages:(a) its cheaper that the conventional mechanical printers; (b) the quality of the print is greatly improved, and (c) it allows a lot more flexibility in forms design in doing preprinted forms The other advantage which is also important is the capability of providing print in both official languages.

We have introduced a relational database in the mainframe environment. The Linc product we are looking at is a fourth GL tool which can be integrated with the relational database product. We've also spent a fair amount of time working with the other UNISYS 1100 users in the Atlantic Provinces in trying to develop a back-up Disaster Recovery Site. I guess the slow down from the experience in the software upgrade sort of drove home the need of having a back-up site, should we have a legitimate disaster.

The other area that we've developed, is a small GIS consultant unit. Of course, with the thrust of GIS in government, there are a lot of people whose knowledge is perhaps limited on GIS, what it does, and what it can do. As a result of that we have created a small group with GIS experts. It is not our intent in this case to replace the private sector, because it is the government's thrust to try to develop as much of the GIS in the private sector as possible. We do feel there is a real need for someone to be making sure clients are getting value for money, and to keep them informed on GIS issues plus provide a certain amount of in-house training.

Probably one of the most important things we have done over the last year is the design and implementation of the Communications Network. We are providing a network that facilitates the growth of distributing computing, and in time distributed computing probably gives us the best of both worlds. It enables the users to have more control over their systems and data, while allowing for the transmission and access of data across the organization. It enables people to access information faster and more accurately.

I think sometime ago when I gave a talk to this conference on the End-User Computing, basically what I said was in reference "it came, they saw, it conquered, we still fight". I think quite honestly we have stopped fighting end-user computing perhaps on the basis of if you can't beat 'em, join 'em. I think that we as a central group is where a lot of the system expertise and alot of the pure technical expertise resides. It represents an opportunity for us to be leaders in that area and perhaps it is a little bit like a quote attributed to Ghandi, "I must go now, because there goes my people, and I am their leader".

I think we've attempted to provide some leadership in the area of technology, and we've accepted end-user computing, but if we look at the future and where it is going, I think the two big areas in the future are in the areas of Open Systems and in the area of Integration of Technologies. I think to truly achieve all of the advantages of technology, nothing will happen until we have systems integrated across the organization.

When I talk about distributing computing I basically mean two or more computers hooked together through some sort of communication link. As Max said awhile ago the ultimate end-user out there doesn't really care where his data is being processed or where he is getting it from, as long as he is able to do what he wants to do, and he can access that data when he needs to access it. I think in time we're going to see is a network of computers across government and in effect if you want a utility of the processing power and distributed processing only becomes effective when there is a total integration of dataflow between corporate and departmental systems and some sort of uniform policies for the fluction and storage of data throughout the organization. This requires not only hardware and software standards, but also a constant exchange of ideas and information in a co-operative atmosphere.

I think the day has gone by when we issued decrees by the Board of Management, and no one ever listens to them. I think whatever standards we're developing on a government-wide basis have to have a maximum amount of input both from the pure technical staff and from the clients who are the ultimate users. I think our commitment to open systems will allow us to take full advantage of technology, but we have to realize that we still have a long way to go before the goal is realized.

An open system to me is a total commitment, with free exchange of data and information while still maintaining the proper security and safeguards. Those people who have the right to access information should be able to do it easily, yet if they don't have that right to the information, then they should not be able to access the information. For the sake of clarification, when I talk open systems I mean a little bit more than UNIX, because one of the things you find today, people talk about Unix/Open Systems together, but UNIX is only an operating system which facilitates moving towards an open systems environment. To truly achieve open systems, I think we have to examine other areas such as software standardization, standard database technologies, communication protocols, standard methodologies, etc. I think one important component of open systems is moving to a standard relational database technology, and a good relational database should house the capability to select multi-physical files, have good query facilities, 4GL interfaces, active data dictionaries, and end-user productivity tools. The end-user tools should permit end-users the capability of creating multi-tabled files without assistance from computer programers, but there should also be a full programming environment to ensure the maximum facility interface. One of the big issues we're facing, is the interlinking of technologies. We can talk about distributive computing, communications networking, application systems, information systems, office systems, database management and I think as I said earlier, before those truly become effective, we have to move to an open systems environment, where all of those technologies are interlinked and the proper communication links exist.

This is where the IS group must adapt in providing service and to do that we have to organize ourselves better to carry out research and product evaluation in information technology, and perhaps become the corporate maintainers of data and the managers of the corporate network. Our role has changed and we must also change.

I would like to have used this forum to outline our organizational changes, but since we are in the process of reviewing those, and our staff has not been informed, I'm only limiting myself to generalities. Any organization changes that will be made in the IS group I hope will address the corporate research and product evaluation issue as well as the facilities management area.

I'm sure when it's all said and done, everyone will look at any organizational changes we make and say, "same old pigeons, just different roosts", but I don't think that's quite true, I think what we're attempting to do is to orient our organization to the wants and needs of our client community and also try to address those particular issues that we feel are not being addressed adequately at the current time. For instance, our group has done a lot of corporate research and product evaluation, but what we'd like to do is get more focuses

What we hope to do is carry research out on a project basis, with proper milestones and identified deliverables and with a maximum amount of client input. Some projects may need a steering committee, and the representation of this committee will depend on the project being carried out and the wants and immediate needs of some of our clients.

One of the things we also hope to do is make available a facilities management service. In some cases, it may be barely operating a computer for clients, and it's quite possible today with technology to operate a half a dozen computers located in many locations off of one console. I think there are efficiencies that can be obtained and it is a service that we can certainly provide to many of our clients. On the other hand, I'm sure there are clients there who feel they would rather go to Total Systems Integration--in other words I have a problem in technology, and I want you to solve it for me and that may mean hardware, software, whatever resources are necessary to solve that problem, and I guess that's what I mean when I say we want to address whatever the level of service the client desires. It will be a client decision basically, on what level of service they need.

Obviously, we still want to continue with our traditional services, but I think we want to put much more emphasis on service and on the issue of providing advice and consultations to clients in the use of information technology versus perhaps the traditional programming, systems maintenance, and development activities. I expect one of the things we will see is more and more use of the private sector. Perhaps in the point of actually contracting out the maintenance of the entire systems. Again, this is again a matter that will be between ourselves and our clients.

It probably means we'll be reviewing our staffing requirements because the type of people we have in the central group will move more and more into the consulting, such as assisting people in strategic information plans, giving advice and consultation on technical problems, and becoming the internal Systemhouse or DMR's of government with a lot of the actual programming work being carried on in the private sector. There is a committment by our department to "no growth" in terms of the number of resources, or number of people within the IS group. That isn't to say that we're not going to continue to carry out our mandate, just that we're going to look at different ways of doing it.

We will also look at, more exchanges of people between the Information Systems Group and the client community, both to give our people broader exposure to client needs and requirements, but also to allow clients to move into a systems world, to gain the knowledge and perspective that may come from working with the central systems group. One of the things we will be doing in the next while, is working with departments in trying to develop some sort of an employee exchange program. I think many of you may benefit. There are employees out there, particularly in small departments, who may see themselves dead ended in their own systems organization. They may welcome opportunities to move around and gain training experience on a broader scale, and I think eventually may come back as better and more productive employees.

Above all what we hope to instill in our total organization is a client orientation, where the customer comes first, and the customer is always right.

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 16, 1990

ITSSC
INFORMATION TECHNOLOGY STRATEGY STEERING COMMITTEE

by

John Roushorne
Deputy Minister
Department of Labour

In 1988 the government adopted an information technology strategy which had many laudable and worthwhile objectives. As I'm sure Jerry Henry will be dealing with these objectives in his progress report on the strategy, I won't either pre-empt him or belabour the subject by talking at any length on the content of the strategy at this point: I would, however, observe that the objectives of the strategy really boiled down to bringing order to the relative chaos which had begun to characterize the information processing environment in government. It did this by putting in place a policy framework which promoted rational decision making in this field while clarifying the responsibility and, therefore, the accountability of line departments to manage information in a fashion supportive of their specific objectives as well as the broader corporate needs of the organization.

When the strategy was being formulated, it became evident that it was the policy and senior decision making needs of government that were being least served by the Systems and Technology then in place (if I might be permitted a digression from the broad thrust of my remarks, the Department of Labour was one notable exception to this conclusion). It was also evident that this corporate deficiency would not be resolved without the establishment of some mechanism which would provide for central influence over the essentially departmental decisions regarding information activities without unduly interfering with the essential managerial prerogatives of the departments. The Deputy Ministers involved with the study understood well the tensions which exist between central and departmental interests - such an understanding comes with the job, whether you're located at the centre or in a line department.

They saw a mechanism which would balance the conflicting considerations, while coordinating activities to maximize the benefits of both interests, as being an essential component of the successful implementation of the strategy. Thus on July 18, 1988 the Board of Management established a committee of a Deputy Ministers to oversee and direct the implementation of the government's information technology strategy and to provide advice to the Board of Management on Information Technology Issues.

It was intended and designed that the committee would carry out its responsibilities in a fashion which would blend the departmental and corporate interests to the greatest extent possible but in any case ensure a fair and equitable consideration of any issues where it was determined a "WIN/WIN" solution was not possible.

The committee is made up of eight deputy ministers, chaired by the secretary of the Board of Management, with the C.I.R.O. providing secretarial support. The current membership adequately reflects the mix of central/line responsibilities that I alluded to earlier and includes the Deputies of Health and Community Services, Natural Resources and Energy, Transportation, Supply & Services, Policy Secretariat, the Comptroller and myself.

The terms of reference of the committee are:

- Recommend to the Board of Management Policies and standards for information resource management and technology acquisition and application

- Establish priorities for work undertaken by the corporate information resource office, task groups, ISG and other, that is related to the Information Technology Strategy.

- Provide direction for the Chief Information Resource Officer on all matters related to the management of the information resource and the use of information technologies in the government.

- Coordinate, and consolidate where appropriate, plans of departments and agencies regarding their use of information technologies.

- Recommend amendments and updates to the Information Technology Strategy to the Board of Management as deemed appropriate.

- Report annually to the Board of Management on progress and results achieved in pursuit of the strategy.

- As can be seen by the terms of reference there is a requirement for the committee to get involved with individual department's activities where they relate to information management and use of information technologies. Frankly, being a committee of Deputy Ministers we are sensitive to and understand the issue of Non-Departmental officials exercising influence over internal departmental management decisions. Being heads of departments ourselves we are reluctant to get involved in any administrative decision of other departments.

Having said that, we also recognize that the government is a single organization and that there are corporate interests that need to be addressed. This is certainly not unique to the information technology field: as many of you would be aware, a sense of the "corporate" has evolved in other ares seen as important to the government such as executive development and human resource management.

As I mentioned earlier, it was discovered that it is the policy and senior decision-making levels of the government whose information needs are least served by the systems and technology currently installed. The study also indicated that many of those needs might be met from the data that already is collected and managed by departments. We need to recognize that data in departments is an important resource that can be employed for more than individual program management. To bring about data sharing across organizational boundaries a variety of actions have been identified as necessary. Collectively these actions represent our strategy. To oversee those actions and to ensure they are carried out in such a way that reflects the interests and concerns of both departments and central government a coordinating mechanism is needed.

A steering committee of deputy ministers with strong representation from line departments is the solution selected. As well you will note that the other central mechanism, that of the corporate information resource office, has purposely been set up with minimal staff so that a collaborative approach to policy development and standards development is encouraged.

I think I've covered most of what I wanted to say concerning intentions and objectives. I mentioned earlier the Chief Information Resource Officer provides the staff support to our committee which puts him in an ideal place to report on progress to date! I'm sure Jerry's report will attest to the success we've had in fulfilling our mandate - after all what choices does he have?

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 16, 1990

INFORMATION TECHNOLOGY STRATEGY UPDATE

by

Gerald Henry
Chief Information Resource Officer
Board of Management

INFORMATION TECHNOLOGY STRATEGY - PROGRESS REPORT

Prepared by Gerry Henry

For Presentation to the Information Technology Conference

May 1990

INTRODUCTION:

The Government's Information Technology Strategy was adopted in March 1988. What I hope to do today is bring you up-to-date on how much progress has been made since the strategy was adopted.

I'll first review the objectives of the Strategy and its key components. I'll then give a brief outline of the activities that have been undertaken to implement the Strategy. Some have been completed, additional activities are now underway, and more are planned for the near future. I will attempt to explain how these activities and initiatives relate to the Strategy.

OBJECTIVES OF STRATEGY:

First let us review the objectives of our Strategy. In general the Strategy is directed at improving our use of information and the technology used to manage it. It is recognised that this is a long term endeavour. Achievment is not anticipated over-night. The Strategy anticipates a 10 year time frame over which the improvements will be achieved. So far two years have passed since the Strategy was adopted.

There are eight objectives of the Strategy as follows:

1. Establish an Information Management Framework which will effectively support decision-making at the operational, tactical and strategic levels throughout the Government

2. Increase decentralized delivery of Government services and improve centralized quality assurance, through better information support.

3. Help improve selection and evaluation of Government programs.

4. Help improve the efficiency and effectiveness of:
   * Government program delivery, in both official languages; and,
   * Management of natural resources.
5. Enhance the responsibility and accountability of program managers with respect to the management of information.
6. Rationalize the management of the Information Technologies throughout the Government:
   * to ensure the coherence, effectiveness and cost efficiency of the central and departmental hardware/software infrastructures;
   * to improve significantly the efficiency of the systems development function in the government; and,
   * to make all departments and agencies effective producers and users of information.
7. Attain an optimal balance between centralization and decentralization in the management of the Information Technologies.
8. Encourage the development of New Brunswick technology and human resources and use government procurement capability to support indigenous industry.

As memtioned before you can see that a major theme running through many of the objectives is improved use of data. I believe that data sharing is the key to meeting these objectives. You will note that many of the initiatives we have taken and are starting reflect the data sharing theme.

STRATEGY ELEMENTS:

The strategy recognizes that information technology offers a wide range of options for meeting information management requirements. The selection from among these options should be guided by the needs for information by the several levels in the government organization. Where the information being managed is valuable to more than one unit in the hierarchy it might suggest a departmental or corporate system approach. On the other hand there will be cases where a solution is selected that is a stand-alone system used only by one person or work unit.

Since data sharing is a major thrust of the strategy, technology to support such sharing becomes key to achieving the strategy's objective. Comprehensive data communications capabilities are essential to accomplishing data sharing across the variety and dispersed organizational units of government.

The programs of government and their information can be related to one or more of three domains (Residents, Enterprises, Land). Information needed by all levels in the hierarchy revolves around one or more of these information domains. Currently, because each organizational unit has dealt with its information needs in isolation from other organizational units, considerable duplication of data, and more importantly procedures, exists.

Because of the independent pursuit of information management procedures by the many organizational units, there exists a wide variety of technology in use. There is much incompatibility among the variety of technologies employed. Such incompatibility creates barriers to data sharing. Even in cases where it is not evident that others may have use for data managed with a stand-alone application of technology, it may be found later that ease of sharing that data is valuable. The strategy therefore is to remove this incompatibility among all levels of technology over time.

The last part of the strategy has to do with the administrative framework that is needed to facilitate pursuit of the strategy. The Government of New Brunswick has in the past carried out much of its application of information technology through a central supplier of data processing services. Over the past several years however, departments have exercised much more independence in this area and implemented information technology without involvement from the central service.

It was recognized that in this environment of dispersed authority for information systems it would be difficult to achieve the strategy. To overcome this barrier while still providing a significant degree of autonomy to departments to select the information management solutions they determine as best for them, a coordinating mechanism was seen as necessary. The central coordinating mechanisms are the Deputy Minister Steering Committee known as the Information Technology Strategy Steering Committee, and the Corporate Information Resource Office of the Board of Management.

INITIATIVES TAKEN TO DATE:

Several initiatives have been taken and others started that are intended to help us meet the objectives of our Information Technology Strategy and move us in the direction of the vision implied by the Strategy.

During the development of the Information Technology Strategy it was recognized that in order to achieve data sharing a certain level of central influence through coordination would be needed. Thus the establishment of these central mechanisms to provide the coordination and leadership needed.

Planning was identified as crucial to ensuring that individual operational decisions reflected the longer term view of where we want to go in our application of information technology. Thus one of the early initiatives was to develop and adopt a framework policy that provided the requirement for this important ingredient.

If the corporate interests are to be given some degree of influence in order to coordinate the activities that affect our movement toward a common goal, then they need to be adequately informed of what the intended activities are. This is intended to be accomplished through the vetting of plans through the Board of Management. Succinct and standard forms of conveying plans will help in providing the needed information to the Board. Thus a Guide has been developed.

One way to make more effective use of the data resources is to put those resources to more uses. It is believed that considerably more information can be derived from the data holdings we have than is now being produced. It is also believed that such additional information will be useful to high level strategy and policy makers.

Additional information can be obtained in either of two ways. It can be created by collecting the necessary data from which to derive the information wanted, or it can be created by linking existing data sources. The latter solution would be the least costly if the needed data resides in existing files and if that data can be linked.

If all data were being managed by the same technology and if all data adhered to standard definitions, codes, and formats it would be easy to link it to produce new information. With the advent of Open Systems standards we will not have to decide on one technology to manage our data. However we will have to develop and adopt standards for the variety of technologies we wish to employ if we wish to share data among our organizations. Such technology standards have been developed and adopted on a trial basis.

Standards for the data itself are also needed so that it can be commonly understood by all who may be a prospective user. There is little benefit from installing technology that adheres to standards and thus supports interoperability and data sharing if once shared the user can't understand the data. The development of a Corporate Data Model and the identification of the related mechanisms needed to facilitate data sharing is a first step to establishing the standards needed around the data. This project has identified as the needed mechanisms surrounding the data itself: a data catalogue/inventory; data format standards; unique commonly applied identifiers for the major entities; and, the adoption of the principle of a logical single database. The next step in this project will be to design and implement a data inventory with on-line access.

The third element of standards that is required to facilitate data sharing is the application software used to manage the data. If the various data management software employed by departments can easily (transparently) transfer data among them, then data can be linked, correlated and aggregated to create new information. Here again it is not necessary to select a single set of application tools, but rather identify the several that adhere to open systems standards and meet the general requirements of our organization. A project is now being defined to recommend a preferred set of application development tools.

At the same time as the Information Technology Strategy was approved by the Government, funds were approved to design and tender for a data communications network. To date the system has been installed in Fredericton and Moncton and is under extensive testing.

The department of Supply and Services is responsible for installing this system and are able to demonstrate it and respond to any questions.

FUTURE PLANS:

There are undoubtedly more steps to be taken. The work started will have to be completed, monitored and standards revised as necessary. Standards around data itself will have to be developed, and common identifiers selected.

A good deal of the framework needed has been put in place. As standards and data sharing mechanisms get developed our efforts will turn to implementation and updating activities.

SUMMARY:

It has been just under 2 years since the first steps were taken to implement the Government's Information Technology Strategy.

It is still early for concrete evidence that the objectives of the Strategy will be achieved.

The objectives are still valid and believed to be achievable.

Work to date has been focused mainly on putting the framework in place that is needed to facilitate data sharing.

With the implementation of Strategic Information Plans, technical standards, and the X.25 data communications network, as well as a start on establishing a data inventory, we should begin to see measurable results over the next year.

There is much work left to do. It includes implementation of plans, further installation and implementation of the X.25 communications network, and application of the technology standards. As well efforts are required to develop and adopt data standards, unique identifiers for the major data entities, and to develop a data index to support data sharing.

Progress has been made over the past two years but full achievment of the objectives is still a few years away.

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 16, 1990

IMPLEMENTING THE STRATEGIC INFORMATION PLAN

by

Robert Saintonge
Deputy Minister
Department of Agriculture

When I spoke at this conference in November of 1988, we had completed our Strategic Information Plan, and we had just received Board of Management approval. We began our implementation with optimism and a strong commitment. One year and a half has past, and we have made significant progress. Today, I will review our experiences in implementing a Strategic Information Plan. I will share the lessons we have learned, and the benefits we have received from the plan. I will also comment on what effective use of information technology means to the Department.

Background

In the years leading up to this planning study, senior management at the Department was aware that we were not using computer technology to full advantage. Individual branches had addressed a number of specific problems with varying amounts of success, but the information was still not available to senior management in a timely fashion. Simple requests would take hours; a more complex question might not be answered for days. Also, there were great discrepancies in the level of automation among different branches. Some were using minicomputers, others used microcomputers, or some no computers at all.

There was much duplication of effort and little sharing of information. We had created the islands of information so common in large organizations today. We faced a time consuming and difficult task to analyze the effectiveness of our programs. In practical terms, it was nearly impossible to see in total what we were doing for an individual producer, a specific region, or a particular industry.

As the demands continued to grow for more computers, we knew we had to change our approach. In 1988, the Department of Agriculture contracted with the Department of Supply and Services to develop a Strategic Information Plan, the first of its kind for a New Brunswick Government Department. We undertook a six month study which began in January with four people from Supply and Services and one from our Department. The team interviewed staff from all branches in the Department, from senior management to directors, technicians, and support staff. Presentations were made to management and the steering committee on a regular basis throughout the project, and the final reports were delivered in June.

The plan does not represent complete computerization of the Department, but rather it describes a target environment where information technology supports our programs, and improves the productivity of our staff. It concentrates on cost saving opportunities, and our strategic and operational information needs. The target environment is an attainable and realistic goal that is within our technical and financial means.

The plan identifies the information we need to effectively manage our programs, and it identifies what information needs to be shared, consolidated, and integrated. The action plan is organized into a series of short projects that should be easy to manage, and will produce usable results each step of the way.

Progress to Date

To review progress to date, I will examine the recommendations in four areas, Personnel, Policy, Systems, and Technology.

Personnel

The plan made three recommendations on personnel, two of which have been implemented. The first recommendation was to establish a position of Manager of Information Systems to coordinate the implementation of the plan. We addressed this immediately by contracting the planning team's Lead Consultant. We later acquired a position, and staffed it on a full time basis.

The second recommendation was to add one more staff person to the Information Systems Section to provide training and operational support, and to help maintain a detailed working knowledge of our systems in the Department. We have used some contract resources, and students from the U.N.B. Co-op program in these roles, but we have not yet established a full time position. This has slowed our progress somewhat and put extra demands on the staff we have.

The third recommendation was to use contract resources for the development and maintenance of our systems instead of increasing our own staff complement. We currently use 4 private consultants, and a number of people from Supply and Services. This is proving to be a satisfactory arrangement to meet our needs.

Policy

The plan made 15 recommendations on information management policy, and we implemented 14 of them within the first six months. With these policies, standards for the selection and acquisition of all computer hardware and software are set by the Manager of Information Systems. He reviews all computer related purchase requisitions in advance for compliance with the standards. Further, all Information Systems personnel are selected, contracted, and managed by the Manager of Information Systems. Data definition, ownership, and sharing rules are defined by our coordinating committee. This committee has a representative from each branch in the Department, and is chaired by the Manager of Information Systems.

The one policy recommendation that has not been implemented concerns funding of computer projects. We have not merged our various data processing budgets into one, but we have chosen to leave these funds in the branches. We feel that information technology must be managed by the directors just as they manage their other resources. I could compare this to Human Resources Management. The director must manage his staff on a day to day basis. The Human Resource staff assist the directors with recruitment, career planning, and performance reviews. In the same way, our Manager of Information Systems assists directors in implementing the technology effectively to meet the branch needs while supporting the overall departmental objectives.

Systems

In the area of information systems, and productivity tools, the plan made a total of 36 recommendations. We have completed the implementation of 4 of those recommendations, and we are currently actively working on 12 others. The remaining 20 projects will be scheduled, when resources permit. We estimate that the projects underway represent about 1/4 of the systems work described in the plan.

The most important of these recommendations is the Client Profile. This is a series of systems with an integrated database that will include all aspects of financial assistance that we provide to producers. It will be the key to the total picture of the clients we serve and the cumulative effect of our many programs. We have established our base file of client names, and addresses. We are building the commodity information on each producer now. Later this month, we will integrate the management system for our largest Federal Provincial Agreement, the Cooperative Agreement on Agri-Food Development -- CAAFD.

The Client Profile will be integrated with our other major database, the Land Information System. With this integration, financial programs to assist producers can be viewed and analyzed in their effect on the land resource we work to conserve and develop.

All of the systems work we have done is consistent with the plan, but the sequence of projects has varied from the original design. Some of our priorities have changed, and we have responded to this by changing the order of some tasks. Some new problems and opportunities have required attention, and they have been added to our work plans.

By leaving the budget in the hands of the Branch Directors, some priorities have been set by them rather than the Manager of Information Systems. This is an expected result of delegation of authority as each director works to meet his specific program objectives. The authority given to the Manager of Information Systems has ensured that each system is built to support the total objectives of the Department and the Strategic Information Plan.

Technology

In the area of technology, the plan is based on the principle of central data management, and distributed processing power. The plan made three recommendations, all of which have been implemented.

First, it calls for the acquisition of powerful desktop microcomputers to provide quick productivity gains, and to provide access to the future databases. The purchase of these microcomputers and associated staff training consumed much of our time and resources for the first year. The substantial reduction in the price of microcomputers has permitted us to move much faster on this recommendation than originally planned.

The second recommendation concerned the small work group level. We have installed Data-PBX switches in two offices to permit sharing of printers and communication lines. These switches may be replaced by Local Area Networks as our needs grow.

The third recommendation calls for the use of minicomputer technology as the central database server. We have implemented this recommendation also, but with an important difference. The plan recommended the expansion of one of our proprietary minicomputers to act as the database server. When we looked closely at this hardware recommendation last spring, we found several things had changed in the year since the plan was delivered.

First, we were aware of industry trends toward improved interconnection and interoperability of various computers. This affects us directly as the plan calls for our business systems to be integrated with our Geographical Information System(G.I.S). The recommended hardware was very unique in its technology, and it was not a good candidate for interconnection with other computers.

Second, we like the portability, compatibility, and price performance of Open Systems. Our experience with MS/DOS in desktop computers had been very good. We currently use 11 different brands of microcomputers with no incompatibility problems. Competition saw prices of one of those microcomputers drop 35% in 10 months. We were concerned that a proprietary minicomputer could not match the same value for money.

Third, we were also participating with Board of Management's Chief Information Resource Officer in the development of New Brunswick Government Technology Standards, based on open systems. We did not want to invest in hardware that was not in line with the government policy we were helping to develop.

Fourth, the computer vendor recommended by the plan was in financial trouble, and we were concerned about the company's long term viability, and its ability to offer future product support and development.

In May of last year, we decided to formally reexamine our central minicomputer options. We asked 5 vendors for system configurations, both open and proprietary, that could meet our needs. We worked with Supply and Services to review those submissions. Our joint examination of options and subsequent research told us three things. First, it was technically viable
for us to adopt an open systems approach based on the UNIX operating system. We found there is a good range of mature products available under UNIX, including Ingres which is the database handler for our Geographical Information System. Second, it was also financially viable for us to select an open systems solution in place of the earlier recommendation. The fierce price competition we saw in MS/DOS microcomputers was being repeated. In our case, UNIX based minicomputers cost 30% to 40% less than comparable proprietary computers. Third, a configuration of two or more networked small minicomputers was viable compared to one larger computer. Three out of five vendors recommended networked solutions.

An interesting sideline on networked computers arose last summer when one of my staff was attending a computer conference. A speaker from the City of Windsor was talking about the new computer that he had purchased for his programming staff. He mentioned that the programming machine would be located in a different building from the production machine. Two computers in two different locations running identical software provided him with all the disaster recovery capability he needed.

We followed a similar course, and selected two networked minicomputers that are located in two buildings at the Research Station. With our approach, the two computers would be connected to work as one system on a day to day basis. In the event of a major disaster at one site, the other machine could operate independently to meet our critical business systems needs.

We chose the UNIX operating system for the minicomputers. It represents the best price performance, and it is consistent with the recently approved government standards. UNIX is the best implementation of the open systems concepts today, and should have excellent long term viability.

We also chose the Ingres Relational Database, and programming tools. Because Ingres is the database handler for the CARIS G.I.S., the integration of G.I.S. with business systems will be much easier. Also, Ingres has a module called Ingres/Star designed specifically to manage a database spread over two machines. This compliments our disaster recovery strategy very well.

In October, we received proposals from seven vendors for a total of 10 different configurations. We selected two Unisys U6000 computers, and Ethernet networks. Both systems are linked to the new province wide network being set up by Supply and Services, and that network will provide access for our regional offices. The equipment was received in March, and our first system was implemented earlier this month.

This change of minicomputer did not come without some penalty. We had to identify funding for the total purchase cost, whereas the expansion of existing equipment would have been spread out over several years. We were fortunate in receiving support from Board of Management in arranging funding for the purchase.

We invested $15,000 in programming one system in the old technology as part of the implementation. This system is in place and is serving branch needs well, and it has provided us with a prototype for future systems. This work will have to be repeated within two years on the new minicomputer.

The entire selection and acquisition process for the minicomputers took 10 months. We were most concerned with the potential loss of momentum in the systems development and implementation. This was kept to a minimum by using the benefits of the Open Systems approach. We arranged for the rental of an 8 user UNIX microcomputer for the programmers to use while we were selecting and installing our new minicomputers. Programming began in November, weeks before the new minicomputers were chosen. We have since moved the programs from the development computer to our new minicomputers, and put them into production without any conversion.

Success Factors

There are several factors that have been important in the success of this Strategic Information Plan and its implementation to date.

Readiness for Change.

There was a wide spread readiness for change in the Department. Many managers, professionals, and support staff knew we could do a better job with appropriate information technology, and they were prepared to give the ideas in the plan a chance to succeed. Their support and cooperation is surely responsible for much of the success we have had.

A Fast Start

A fast start is very important in getting the backing of staff for implementation of the plan. During the interviews for development of the plan, the study team would close each interview with the question, "What do you think will happen as a result of this plan?" The answer was a laugh, followed by the response, "It will go nowhere, just like the other studies!" The implementation of this plan was attacked enthusiastically, both with management policy and with long overdue productivity tools, and staff responded quickly and strongly.

Role of Manager of Information Systems

The selection of the coordinator for implementation of the plan is another key element to success. He or she must be a champion of the plan, fully committed to its implementation. He must be able to understand information systems technologies, but more importantly, he must be able to judge where and how to apply them. He must be a manager, not a programmer. He must concentrate on having the right solutions built and delivered without getting lost in the details of how it is done.

The manager must always work from the perspective of the overall departmental needs. He must be free of branch loyalties or the plan will be seen as one branch forcing its ideas on the whole department. In our case, the Manager of Information Systems is part of the Administration Branch. He reports to the Senior Executive Committee for direction on matters of policy and priorities.

Adaptation

Controlled variance from the plan is necessary and desirable. The plan is not a cookbook that can be followed in every detail, but a strong guide. It must be adapted and adjusted to real situations. We varied in the sequence of projects, and the int brand of minicomputers we chose. Success was not jeopardized by these changes because the objectives and principles of the plan were kept in sight.

Cost Estimates

Cost estimates made with this limited level of detail available during a planning study are far from perfect. The industry is changing as the hardware and software costs change constantly, and the staff cost continues to escalate. Projects are too limitedly defined to permit any accuracy in estimation. And as always, computer projects cost more that we expect. The total cost of implementation will likely be double the original estimate.

The cost estimates must continue to be part of the planning study, but the level of accuracy must be recognized, and they must be updated much more often.

Benefits of a Strategic Information Plan.

The benefits of Strategic Information Planning are the same as the benefits of good planning in other management situations.

Cost Savings

Planning saves money. We know today that the substantial investment we are making in information systems will support individual branch operation and overall departmental management information needs. This reduces risk for these major expenditures. Senior management will get much of the information we need as byproducts of the operational systems. This approach will be much cheaper, faster, and more reliable than trying to produce information after the fact.

The Strategic Information Plan also saves money in systems development. Our project teams already have basic system structures and data relationships defined that are needed to meet the overall departmental needs. The project team expands the detail to meet the individual branch needs, and then complete the system. This preliminary design cuts weeks off of each system we develop.

Integration of data will reduce duplication, and this will reduce current data capture costs, and save future costs in file maintenance. The reduction in data inconsistencies will reduce our analysis time and cost. The result will be more accurate data that will lead to better decisions.

Staff Cooperation

Computer technology properly applied can improve cooperation among staff. This is most evident among staff from different branches who do not usually work together. Staff understand better the relationship of their work and information with that of others when they can see who can use and benefit from their data. They also see new possibilities when they combine data from other branches into their own information systems.

Improved Change Management

Change management is always difficult, but the Strategic Information Plan has eased the acceptance of change among our staff. They can see that changes both small and large have a reason that supports an overall objective.

Effect of Information Technology

I would like to conclude by talking about what the use of information technology has meant to the Department and to our relationship with the producers.

We are pleased to be getting the kind of productivity gains associated with computerization. Our Farm Management staff can assist producers with more advanced financial evaluations, and prepare various scenarios in much less time. Our revised Crop Insurance System will permit us to extend this coverage to more producers and more commodities with minimal increase in staff. Improved methods for tracking and processing applications under the CAAFD Federal /Provincial Agreement will give faster service to producers, and reduce our staff effort required.

The information technology has opened the door for fundamental change in the way we deal with producers. In the past, our financial programs have been oriented to assisting producers with capital investment or infrastructure. If, for example, a producer wanted to improve drainage on a field to increase yields, we might assist him by paying a percentage of the up front cost. This type of program is valuable, and will be continued.

With the use of information technology, we can now introduce a new type of program based on performance. The first of this type was developed for the Hog Industry, and it is known as Pig Champ. With this program, we collect cost of production statistics, and a variety of performance indicators for producers. National and regional averages are calculated and published. We also prepare the same statistics for individual producers for their private use. The producer can review these indicators with our Hog Production specialist, and compare his performance with the averages. Individual areas of weakness are quickly spotted. We can then assemble a team of specialists to look at the problem area, and find a solution.

Further, by establishing a base level of activity, we can offer programs to help improve performance, and then monitor the progress against the base information. Financial incentives can be arranged so that payment is tied to the level of improvement. We are, therefore, helping to finance productivity and efficiency gains in the industry, and that supports our primary goal of developing a viable agri-food industry in New Brunswick.

Pig Champ has been very well received by the Hog Industry, and we are making plans to develop similar programs for other commodities. This type of program would not be possible without the use of information technology for the statistical calculations.

Conclusion

Information technology is changing the way we work, and it is changing the work we do. We are offering more and better programs to support the development of the industry. In time, we will be better able to monitor to results of individual programs as well as their cumulative effect on the industry. Our Strategic Information Plan is guiding these changes in our Department, and we are surely accomplishing more because of it.

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 16, 1990

CORPORATE PROJECT, NETWORK UPDATE

by

Danny Keizer
Data Centre Services
Department of Supply and Services

Corporate Network Project Update

Information Technology Conference
May 16, 1990

by
Danny Keizer
Data Centre Services
Supply & Services

Good Morning.

I have been asked to present a status report relating to the Data Network Project that I have been working on for the last 3 years.

Some of you, no doubt, have been following the progress of the project in detail. Please be patient as I will be presenting some general information for the benefit of the rest of the audience.

Contents

Background

Accomplishments

Problems

Remaining Work

New Services

Charge-back Rates

Schedule

This slide outlines the contents of my talk this morning

I will begin by presenting some background information including the rationale on which the project is based and a brief project history.

That will be followed by a list of the specific accomplishments that have been realized and an indication of some persistent problems.

Next I will take a look at the other work that must be accomplished before the project is complete.

This will be followed by a discussion of the new services that are now, or will soon be, available and a discussion of charge-back rates for using the network.

Finally a Project Schedule through to completion will be presented.

Background

As I mentioned previously, the project began some three years ago. Let's take a few minutes to try to understand why we got started.

Rationale

Avoid Parallel Networks

The Data Centre has operated a Province-wide network for Terminals connected to Unisys mainframe computers for years. The network reaches every community in New Brunswick where there is a need for access from Government Offices to mainframe based applications. The network supports only one Protocol.

At the time that the Project began, we had added an IBM Mainframe to the Data Centre Complex. IBM had its own protocols and would require a second network going to the same locations.

Furthermore, a number of Departments had settled on their own platforms for application development and were anxious to offer access throughout the Province.

Departmental platforms included async oriented hosts such as DEC Vax, H-P 3000, NCR Tower and Prime as well as IBM S/36s and Wang VSs.

The potential existed for multiple parallel networks, supporting different protocols but servicing the same Government offices.

Avoid Multiple Workstations

Because we were in an environment of multiple development platforms and PC terminal emulations were less perfect than they are today, the possibility of multiple terminals on the same desk existed.

Background

Rationale

Extend Reach

If nothing were done re the networking situation, a connection would be required to each network that an individual was required to use. It would have been far preferable to be able to connect to all required resources to a single "intelligent network". The user's reach could be further extended as new resources (E-Mail, etc.) were added to the network.

Increase Performance/Availability

By concentrating all of the Government's resources on a single network, it was felt that higher speed services and greater availability could be possible. (Although these factors would have to be balanced against cost.)

$$ Savings $$

The cost of implementing and supporting a single network was assumed to be lower than the cost of multiple parallel networks. Savings would accrue through reduced number of support personnel and the ability to share high cost communication lines.

The Unisys mainframe had an advantage over the other technologies in that the cost of adding remote locations for access to applications was predictable and incremental. The same could not be said for other platforms - Major expenditures could be required in extending services on a province-wide basis.

Background

Brief History

Preliminary Analysis

Based on the rationale, we proceeded to look at promising technologies, did some rough cost estimates and collected potential access and traffic volumes.

The bottom line was that the idea looked good enough to follow up on.

Approach

Based on the technologies that were available, we decided to establish concentrators in each of eight major centres throughout the province. The concentrators would be interconnected with high speed communication lines. Each concentrator would handle the connection of specific protocols in the surronding area and be able to dynamically route traffic to any other location in the province.

PCs would be the workstation of choice. By using protocol conversion where necessary, it would be possible to communicate with any host or other PC in the network through a single network connection point.

RFP

Based on the approach defined and the projected traffic/access volumes, a detailed Request for Proposals was prepared.

Several responses were received.

Unisys/Timeplex Proposal

After a thorough analysis, a proposal from Unisys/Timeplex was selected.

The proposal involves the use of Timeplex X.25 switches and PADs and Unisys DCP/15s in each concentrator location.

The Timeplex switches handle X.25 and IBM SDLC connections. Timeplex PADs support Async connections. DCP/15s take care of Unisys protocols.

Support of the X.25 international standard insures network support for almost any vendor's equipment.

A cost analysis showed that $1.9 Million was required up front for implementation. However, compared to the cost of "parallel networks", $.8 Million could be saved per year.

Pilot

Since March of last year, we have been involved in certification of the network - to make sure that products work as specified and ensure a good fit with the Government's Needs.

Accomplishments

During the Pilot we have had a great deal of success in making almost anything we wanted to work. A list of the connection types that we have tested follows. I will not present detail on any of the connection types. We do have some related transparencies and can handle specific questions during the question period following the presentation or later in the demo area.

"PC to Anything" Connectivity

We have connected to just about anything, including other PCs for file transfer using Procomm Plus with the Kermit protocol and all of the host computer environments mentioned below.

Async Host Connections

Connections to Wang, DEC and NCR Tower async ports from async terminals and PCs

X.25 Host Connections

Connections to Unisys U6000s.

Unisys Protocol Converter Access

PC to Unisys over async lines using Chi UTS Emulator and JBM Protocol Converters

Uniscope Connections

Uniscope terminals and PEP/ICC equipped PCs through DCPs connected to Timeplex switches to the O/S 1100 environment.

Accomplishments

IBM SDLC Connections

IBM 3190s connected to an IBM 3174 through Timeplex Switches to an IBM FEP.

Network Gateways

Datapac

Transparent with address translation. Both in and out.

Develnet

Labour and Education.

X.25 LAN Gateway

Using Eicon Adapter and Procomm network version.

Any PC on the LAN can use the gateway to call anywhere on the Network.

Novell LAN Bridging

Using Eicon Hardware and Novell Software.

X.400 Mail Gateway

Using Eicon Hardware, Network Courier software, interconnected to Envoy 100.

Network Courier users can address mail to and receive mail from any Envoy 100 or other connected domain user.

Problems

Character Echoplexing Performance

With character echoplexing, when a key is struck on the keyboard, the corresponding character is sent out through the network to the host and echoed back to the terminal before it is displayed on the screen.

The equipment proposed by Unisys does not provide the performance specified in the proposal. This results in slushy screen response with cursor moves, tabing, etc. and can be frustrating to the user.

Work around solutions have been found for most environments. However, problems remain for users of some DEC applications - particularly All-in-One.

We have found products that are advertised to eliminate the problem for DEC Vax users. However, the ability of a DEC user to connect to multiple environments is limited.

Network Management System

The network management environment originally available with the Timeplex equipment was not adequate. Among other deficiencies, it did not permit on-line backup of the network configuration.

We have taken delivery of a new PC based system that makes up for most of the short comings of the original. Some problems have been experienced, a few remain. One of the more serious problems can bring the entire network down.

Remaining Work

Unisys Related Testing

A major barrier to the completion of the pilot has been Unisys mainframe related testing. In order to carry out the processed a new version of communications software had to be installed. It now looks like this process will be completed by the end of this month and testing can begin in June.

Volume Testing

Before the final stamp of approval can be placed on the Unisys proposal, the products must be tested under load. This testing should be complete by the end of July.

Implementation

Implementation can begin immediately after the volume test is complete. As a result of volume testing, a fully functional node (ie concentrator location) will be located in Moncton. This represents the first activity in the Implementation Phase. A schedule is presented later in the talk.

Because Unisys users already have a network, our efforts will be concentrated on implementing new services. For this reason X.25, Async and SDLC connections may be available in a particular centre before new Unisys protocols are.

X.25/Async/SDLC

Unisys Uniscope, UDLC, etc.

New Services

When implementation is complete, the following services will be available anywhere in the province.

X.25 Network Accesses

Async Network Accesses

Circuit Switching

The ability to switch between multiple network destinations from a single network connection point using simple network commands.

Does not apply to IBM or Unisys terminal users.

Async Uniscope Emulation

Any PC will be able to connect to the Unisys O/S 1100 environment over asynchronous communication lines (after passing security validation). This includes PC users with Hayes compatible modems connected to public dial telephone lines as well as those with async accesses to Datapac or the Government network.

The connection from the PC to the host is error checked end to end and operates in a block mode. File transfer is supported using existing products (tested with Qtran).

The necessary PC software is licensed at the host end. It therefore can be distributed (within reason) at no cost to the Department or individual user. Network and Protocol Converter charges will apply however.

We can currently support a maximum of 16 simultaneous async users. This number will increase as demand warrants.

Other Protocols

SDLC

UDLC

Charge back Rates

More work must be done before actual rates can be announced. This will be a priority in the next month.

The following information is presented to indicated possible maximum rates.

Goal is Cost Recovery

We intend to recover the costs of operating and enhancing the network only.

Central funding has covered the majority of expenses associated with implementing the network.

No Charges Until Fall 1990

There will be no charge for any network services until the fall of 1990.

Charge back Rates

Maximums

(Based on NBTel's Proposed "Provincial Packet Service")

The rates quoted are the maximum to be realized based on a new service offered by NBTel entitled "Provincial Packet Service". The service is the same as Datapac but offers considerably reduced in-Province Kilopacket rates and guaranteed access rates - anywhere in the Province of New Brunswick.

Since the new Government network integrates smoothly with Datapac, the Provincial Packet Service will be utilized when ever it is cheaper than the cost of connecting directly to the Unisys/Timeplex network.

When the cost of using the Government network is lower, clients will be charged a fixed port cost, and the cost of modems and NBTel lines required. A Kilopacket charge will also be applied for the traffic generated.

Provincial Packet Service must receive the approval of NBTel's Telecom Canada Partners as well as the CRTC before it becomes a reality. NBTel indicates that Telecom approval is forthcoming and a respected external consultant claims that CRTC approval should not be a problem. However, Provincial Packet Service is not here yet. If the necessary approvals are not received, we will charge for our network as indicated above (port cost + lines + modems). The maximum access/usage costs then become the full Datapac rate.

Taxes Included

All Federal and Provincial Taxes are included in the figures quoted below. The removal of the 10% Federal Telecommunication Tax at the time that the GST is implemented should result in a slight reduction in rates.

Charge back Rates

Kilopackets

	NBTel Provincial Packet	NBTel Datapac Range
Basic	**$.61**	**$.43-$1.95**
PAD Charge	**$.61**	**$.61**

Other Usage Charges (SVCs, etc.) at Current Datapac Rates

Charge back Rates

X.25 Accesses (/month)

	NBTel Provincial Packet	NBTel Datapac Range
1200 bps	$171	$244-$519
2400 bps	$183	$269-$604
4800 bps	$275	$397-$824
9600 bps	$397	$568-$1117
19200 bps	$641	$928-??

Includes all network equipment. A cable must be supplied to connect to the network.

For Datapac, the low figure applies to Datapac Serving Areas, the high figure to Band 3 service. Off network rates for 19200 bps service were not available - hence the "??".

Charge back Rates

Dedicated Async Accesses (/month)

	NBTel Provincial Packet	NBTel Datapac Range
300 bps	$92-??	$132-??
1200 bps	$128-??	$189-??
2400 bps	$165-??	$236-??

Datapac and Provincial Packet Access Rates for Async apply only within Datapac Serving Area. A basic fee plus the cost of facilities (line & modems) apply otherwise - hence the "??".

Includes all network equipment. A cable must be supplied to connect to the network.

Implementation Schedule

	X.25, Async	Unisys
Moncton	Now	Jun/90
Saint John	Sep/90	Mar/91
Newcastle	Dec/90	Mar/92
Bathurst	Mar/91	Jun/91
Campbellton	Jun/91	Sep/91
Woodstock	Aug/91	Jun/92
Edmundston	Oct/91	Dec/91
St. Stephen	Dec/91	Sep/92

Invitation

Departmental Involvement is Vital, Appreciated and Encouraged

All connection types with the exception of Unisys Protocols can now be tested in Moncton and Fredericton.

The project team currently consists of Drew Ingraham, Gordon Boone and Danny Keizer We're small and very busy but invite you to contact us if there is a particular service that you would like to explore.

Gordon and Drew will be presenting a Demo at lunch time and following this afternoon's session. You are invited to take a closer look at the products and services that I have referred to in this presentation.

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 16, 1990

YEAR 2000 IN THE TRANSLATION ENVIRONMENT

by

Ming Tsui
Director General of Planning, Management & Technology
Official Languages & Translation Sector
Secretary of State, Ottawa

I am very happy to be here with you today. It is a great honour for me to have been asked to participate in this conference on technology, and I would like to take this opportunity to explore a question which is of ongoing concern to the organisation which I represent, the translation bureau. To us in the bureau, striking a balance between human resources and technology is more than a matter of principle -- it affects our operations at every level. Translation has always been considered an art, and in our constantly changing environment, we must combine science with art. Although no one knows what will happen tomorrow, we all know that only those who can adapt to the challenges of the next thousand years will survive. No one has a crystal ball. We can only speculate as to what the situation will be in the year 2000. How, then can we prepare an organization as complex as the federal translation bureau to adapt promptly and effectively to change, as small businesses have done?

The translation bureau is in fact **a complex organization** with a long and rich tradition of service. In 1934, the parliament of canada passed the translation bureau act, giving the bureau a mandate to provide translation services to parliament, the cabinet, the public service, the judiciary and organizations created by parliament or the governor in council. Needless to say, these services are offered not only in the two official languages, but also in some 60 foreign languages and even in sign language. The translation bureau deals with 20 major fields of specialization, including biology, electronics, informatics, physics and earth sciences, and none of these services is discretionary.

The official languages translation service employs more than 100 translators to satisfy the requirements of parliament alone, which are in essence those of the house of commons and the senate. In addition, translation units are located in some 130 federal departments and agencies in the national capital region and the regional offices of the department of the secretary of state. In 1989-90, the translation bureau produced 293 million words, or more than 1 million pages, 35% of which were done under contract.

Interpretation services are provided by approximately 60 interpreters and 20 in-house translator-interpreters for the official languages, approximately 60 for foreign languages and about the same number for sign-language interpretation, who, together with the in-house interpreters, meet the needs of parliament and the departments. Last year, the section provides 20,300 interpreter-days, and 58% of these were done by free lances.

Some 100 employees work in **linguistic services**. They are responsible for standardizing terminology in the federal government and disseminating it by means of the terminology bank, a telephone consultation service and publications. In 1989-90, the terminology bank contained more than 900,000 term records, and nearly 162,000 telephone inquiries were answered, most of which were requests for official titles. In addition, 72 publications were available for purchase.

For some years now, **the translation bureau has been looking to technology to increase its productivity.** Such technological assistance has been in the form of word processing equipment, the terminology bank, machine translation with meteo or, more recently, computer-assisted translation. In 1973, in fact, the translation bureau began to provide funding for a machine translation project at the university of montreal, known as taum, which in 1977 developed meteo, a commercial version. Since then, meteo has translated all canadian weather reports produced outside quebec from english to french, without significant human intervention, at the rate of 15 million words a year. Since january 1989, the system has also been translating from french to english. Meteo, like most machine translation systems currently on the market, uses a primitive technology. Even so, this technology has enabled us to make optimal use of our professional resources.

The meteo experiment led the translation bureau to develop the concept of the automated tool. This is not intended as a miracle instrument that can be used for all texts, regardless of the language or field of specialization. Rather, it is designed to help translators translate. After identifying its automation requirements and surveying the commercially available products, the translation bureau decided to invest in a range of automated tools. To assist in management of the project, the bureau formed a computer-assisted translation committee, better known as the **cat general secretariat**, which I am privileged to head.We have also established a **cat centre** as both a laboratory for testing new technologies and a demonstration centre for prospective users of the latest developments in computer equipment.

For lengthy scientific and technical texts, we selected **logos**, a software package for computer-assisted translation. The logos project is now in its third year. Texts to be translated with logos must be organized, must be written in simple language, that is, in short, clear sentences in which there is no ellipsis, and must conform to the rules of the language. The use of this software can be cost-effective only if there is a sufficient volume of texts for translation meeting these criteria. The most important stage in processing a text with computer-assisted software is post-editing, which accounts for 60% of total translation time. This step makes it possible to correct the machine output so as to ensure that the target text properly reflects the source text and respects the "spirit of the language".

Operational testing of a **translator's workstation** is being done with a view to handling short texts or texts that do not meet the criteria that I just listed. The workstation gives translators simultaneous access to various functions likely to help in their work. Thus, from a single console, translators will have access to word processing, a personal terminology file, the termium terminology bank, concordances, translation comparators and dictionaries. The workstation may eventually be connected to an electronic mail network, which, in an environment where words are the stock in trade, would make a significant change in work organization and methods. All the equipment and software used in this workstation are readily available at reasonable prices.

But, you may ask, **what do translators think of these new tools?** Are they not troubled, or even frightened, by this plethora of tools that are alien to their work habits?

The advent of computer-assisted translation has, in fact, drastically altered the working methods of translators and their very conception of the profession. Computer-assisted translation divides the work into distinct tasks. Formerly, translators always considered the translation process as single entity. Also, before computer-assisted translation was introduced, the process of translating a written text from one language into another was visible in an exchange of terms. This replacement of one term with another is the task that is most readily automated. However, while word substitution can easily be accomplished with translation software, this does not apply to the transfer of meaning. It is still the translator's prerogative to solve the complex problems of semantics, stylistics and specialized vocabulary, and he or she alone is responsible for the overall translation process. It should be noted as well that computer-assisted translation systems require much more teamwork by people who are not necessarily used to it.

It is not surprising that some translators have felt a certain amount of anxiety in the face of such radical changes. Along with these special fears of translators comes the unfortunately too widespread perception that the purpose of the new technologies is to increase productivity at the expense of workers. For this reason, the translation bureau has been placing the emphasis on information in recent years. Understanding is a good antidote to fear of change, a fact which was brought home by a survey of a large group of translators, which revealed :

- That they want to continue to expand their knowledge;
- That they want to work in their field of specialization;
- That they want to produce high-quality translations;

and

- That they want to retain their professional status.

If only translators realized it, automated translation tools will certainly help them achieve their objectives. No doubt a certain amount of time will be needed to become familiar with the new tools, but this is only a phase. Already, the large amount of information disseminated on the new technology and the spread of knowledge that was only recently the province of specialists, has made it possible to win over more than one recalcitrant. Even the most stubborn individuals are adapting, more slowly, perhaps, and with more fear and less willingness, but they are adapting. Who wants to be a dinosaur in the silicon age?

How, you may ask, will automation of some translation tools make the translation bureau ready for the year 2000?

As you know, the federal public service decided to adopt a new image, and an in-depth review is now under way, with a focus on four dimensions: people, structure, management and legislation. It goes without saying that no one knows what the future will bring, but we all know that financial austerity measures will continue to have an impact on our activities for the next 10 or 15 years. It is also clear that the world is shrinking every day, and the ramifications of our actions go beyond our borders. Competition is heating up, and the pace of change is staggering.

For its part, the translation bureau has adapted to many changes in recent years. Among other things, it has learned to live with a new partner in the form of private enterprise. We believe that the most important thing for us today, however, is to maintain the flexible approach that we have already demonstrated. It would seem that, as we approach the end of the century, two quite different kinds of organizations will survive: the multi-disciplinary production team and the corporate service. The production team will become an independent entity operating within parameters that are common to all teams working as an organization.

Because of the very nature of our duties - translation, interpretation and terminology - we at the translation bureau have never lost our sense of professional independence. We know that our professionals are our chief resource. We know that they are our creative force and our potential for innovation. The challenge facing an organization like ours is not to learn to work with specialists; we have already done so. It is not really to learn to use new technologies; we already know how to do this. The challenge is rather to learn, not how to use our new automated tools for faster production, but how to use them in new ways. Our challenge is to make changes in our organization's structure and culture so that they will support, not hinder, adaptation to change, a process that is vital to the survival of any organization.

We are well aware that the state of the art of automating the translation process is but in its infancy. Voice recognition or network development will upset our working habits once again. There will be many opportunities for the translation bureau to maintain its ability to adapt to change. The crux of the harmonious integration of the new technologies into translation is still co- operation among partners, whether they be clients, translators, interpreters, terminologists, managers or members of the private sector. We firmly believe that only through such co-operation will we maintain the optimal balance between human resources and technology, and between art and science.

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 16, 1990

CORPORATE DATA ARCHITECTURE

by

Lyn Fairweather
Board of Management

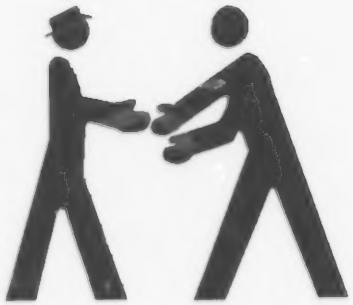
*** PAGE 1 *** (SLIDE 1 "DATA SHARING")

- GOOD AFTERNOON, AS YOU MAY RECALL, GERRY HENRY EXPLAINED THIS MORNING THAT THE NEW BRUNSWICK GOVERNMENT HAS ADOPTED AN INFORMATION TECHNOLOGY STRATEGY TO IMPROVE THE MANAGEMENT AND USE OF INFORMATION THROUGHOUT THE ORGANIZATION.

- ONE OF THE MAJOR THRUSTS OF THIS STRATEGY IS DATA SHARING.

NB GOVERNMENT
INFORMATION TECHNOLOGY STRATEGY

Data sharing



*** PAGE 2 *** (SLIDE 2 "INFORMATION TECH. STRATEGY")

- IN KEEPING WITH THE STRATEGIES OBJECTIVES, THE CORPORATE INFORMATION RESOURCE OFFICE HAS UNDERTAKEN THREE INITIATIVES;

1. THE DATA ARCHITECTURE - THIS IS THE PROJECT I AM GOING TO BE TALKING TO YOU ABOUT TODAY.

2. THE TECHNICAL ARCHITECTURE - THE REPORT IS COMPLETED AND CHARLIE CHAISSON WILL BE DISCUSSING THIS LATER.

3. THE SOFTWARE STANDARDS PROJECT - A PROJECT LOOKING INTO SOFTWARE STANDARDS FOR A PREFERRED APPLICATIONS ENVIRONMENT FOR ALL GOVERNMENT DEVELOPMENT IS JUST STARTING.

NB GOVERNMENT
INFORMATION TECHNOLOGY STRATEGY

Data Architecture

Technical Architecture

Software Standards

*** PAGE 3 *** (SLIDE 3 "AGENDA")

THE SEQUENCE OF MY PRESENTATION WILL BE THIS,

- FIRST I WILL EXPLAIN A BIT ABOUT THE PROJECT.

- THEN I WILL GO OVER A DEMONSTRATION SYSTEM WE DEVELOPED.

- NEXT I WILL REVIEW SOME OF THE MAJOR FINDINGS.

- AND THEN I WILL SUMMARIZE THE PROJECTS RECOMMENDATIONS.

DATA ARCHITECTURE

AGENDA

- ✓ 1. Project definition
- ✓ 2. Demo system
- ✓ 3. Findings
- ✓ 4. Recommendations

*** PAGE 4A *** (SLIDE 4 "CIAP")

- SO TO BEGIN AT THE BEGINNING , THIS PROJECT -- THE CORPORATE INFORMATION ARCHITECTURE PROJECT -- LOOKED AT INFORMATION SHARING FROM THE DATA PERSPECTIVE.

- IT WAS HIGHLIGHTED IN THE DMR STUDY OF A FEW YEARS BACK, THAT THERE WAS A MULTIPLICITY OF FILES THROUGHOUT GOVERNMENT CONTAINING VERY SIMILAR DATA.

- WE INVESTIGATED WHAT MECHANISMS WOULD BE REQUIRED TO ACCOMPLISH THE SHARING OF DATA THROUGHOUT GOVERNMENT AND THUS REDUCE THE DUPLICATION IN COLLECTING AND STORING OF DATA WHILE IMPROVING THE USE OF THIS DATA.

*** PAGE 4B *** (SLIDE 4 "CIAP")

- IN ORDER TO UNDERSTAND WHAT DATA THE GOVERNMENT NEEDS TO DO ITS BUSINESS WE USED A DATA MODELLING TECHNIQUE TO DEVELOP A CONCEPTUAL DATA MODEL FOR GOVERNMENT.
- THIS TECHNIQUE ALLOWED US TO CONCENTRATE ON THE DATA AND ITS RELATIONSHIPS, NOT THE PROCESSES.
- WE WERE CONCERNED WITH ONLY THE DATA THE GOVERNMENT NEEDS TO SERVE ITS CLIENTS AND NOT PURELY INTERNAL ADMINISTRATIVE DATA.
- AFTER FINISHING THE DATA MODEL WE COLLECTED SOME SAMPLE QUESTIONS TO TEST ITS COMPLETENESS.
- FOR IF THE MODEL WAS COMPLETE WE SHOULD BE ABLE TO ANSWER PREVIOUSLY UNANSWERABLE OR HARD TO ANSWER QUESTIONS.
- USING THE DATA MODEL AND THESE QUESTIONS WE THEN BUILT A WORKING DEMONSTRATION SYSTEM, LINKING DIVERSE FILES OF EXISTING INFORMATION TO CREATE NEW INFORMATION.

CORPORATE INFORMATION ARCHITECTURE PROJECT

PURPOSE :

Investigate information sharing

Recommend mechanisms

APPROACH :

Define conceptual model

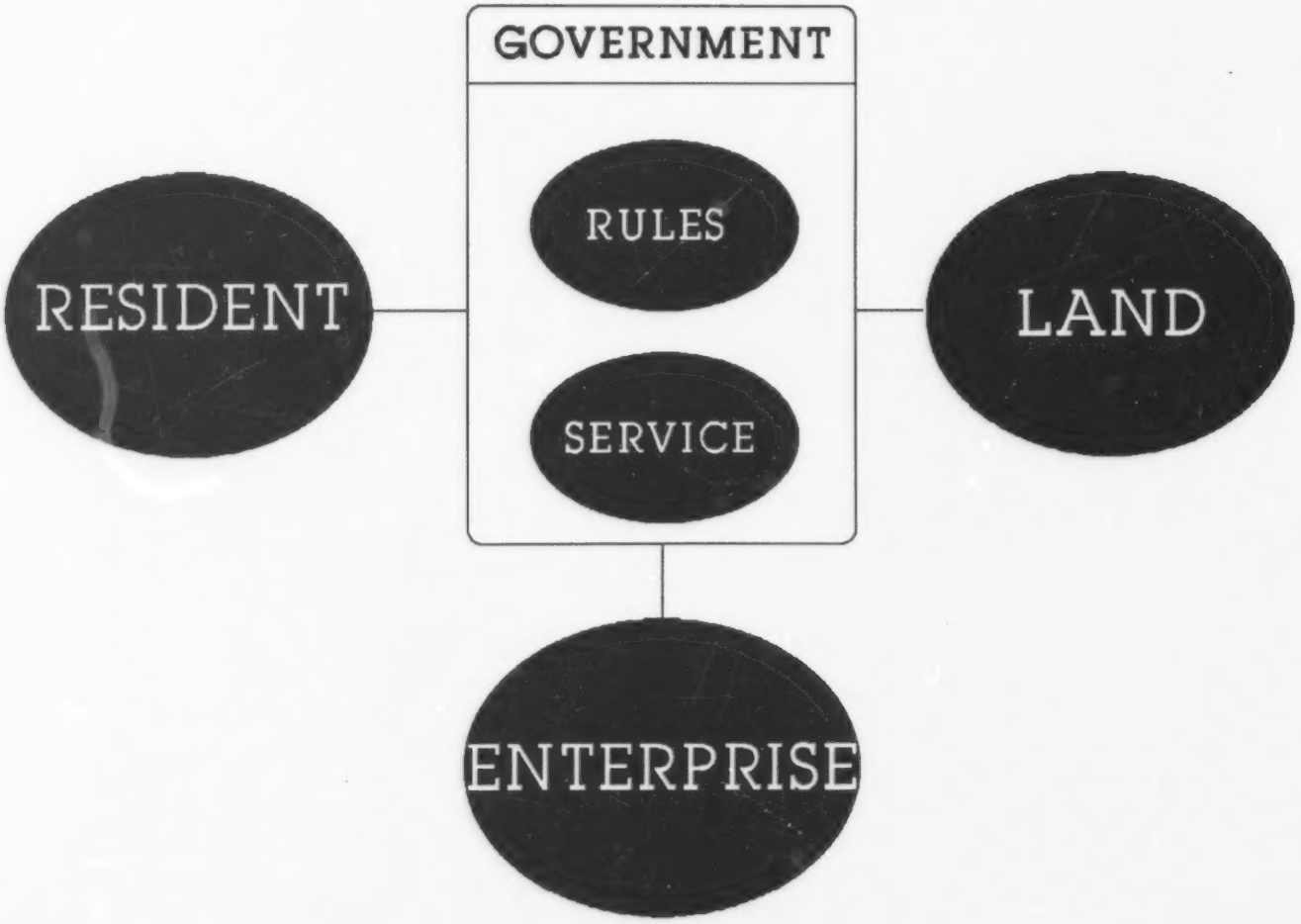
Collect sample questions

Build demo system

*** PAGE 5 *** (SLIDE 5 "CONCEPTUAL DATA MODEL")

- IN DEVELOPING THE CONCEPTUAL DATA MODEL WE REVIEWED THE DATA NEEDED TO SUPPORT THE PROGRAMS AND SERVICES THAT THE GOVERNMENT PROVIDES TO ITS CLIENTS.
- BY IDENTIFYING THE MAIN DATA SUBJECTS AND DEFINING THEIR RELATIONSHIPS TO EACH OTHER, IT BECAME VERY EVIDENT THAT DATA ON RESIDENTS, ENTERPRISES, AND LAND, MAKES UP THE BULK OF THE GOVERNMENTS DATA HOLDINGS.
- THE MODEL INDICATED AREAS OF DATA DUPLICATION AND OPPORTUNITIES FOR DATA SHARING.
- BY INTERVIEWING SENIOR GOVERNMENT STAFF AND DRAWING ON OUR OWN EXPERIENCE WE DEFINED THE RELATIONSHIPS BETWEEN THE MAJOR DATA ENTITIES AND REFINED THE MODEL UNTIL WE WERE READY TO TEST IT FOR ACCURACY AND COMPLETENESS.

CONCEPTUAL DATA MODEL



*** PAGE 6 *** (SLIDE 6 "QUESTION CRITERIA")

TO TEST THE MODEL WE SOLICITED QUESTIONS THAT MET THE FOLLOWING CRITERIA AS CLOSELY AS POSSIBLE;

- THE QUESTIONS SHOULD BE PRESENTLY DIFFICULT OR IMPOSSIBLE TO ANSWER.

- THE ANSWER TO THE QUESTION WOULD PROVIDE NEW INFORMATION.

- TO ANSWER THE QUESTION WE WOULD COMBINE DATA FROM DIFFERENT FILES.

- WE WOULD TRY TO SHOW THE SHARING OF DATA FROM DIFFERENT LEVELS OF COMPUTERS, BE THEY MAINFRAME, MINI, OR MICRO.

- AND FINALLY THE QUESTIONS SHOULD HIGHLIGHT THE RELATIONSHIPS THAT EXIST BETWEEN THE MAJOR DATA DOMAINS.

SAMPLE QUESTION CRITERIA

- Currently difficult to answer
- Provide new information
- Combine different sources
- Include mainframe files
- Involve major data entities

*** PAGE 7A *** (SLIDE 7 "DEMO SYSTEM")

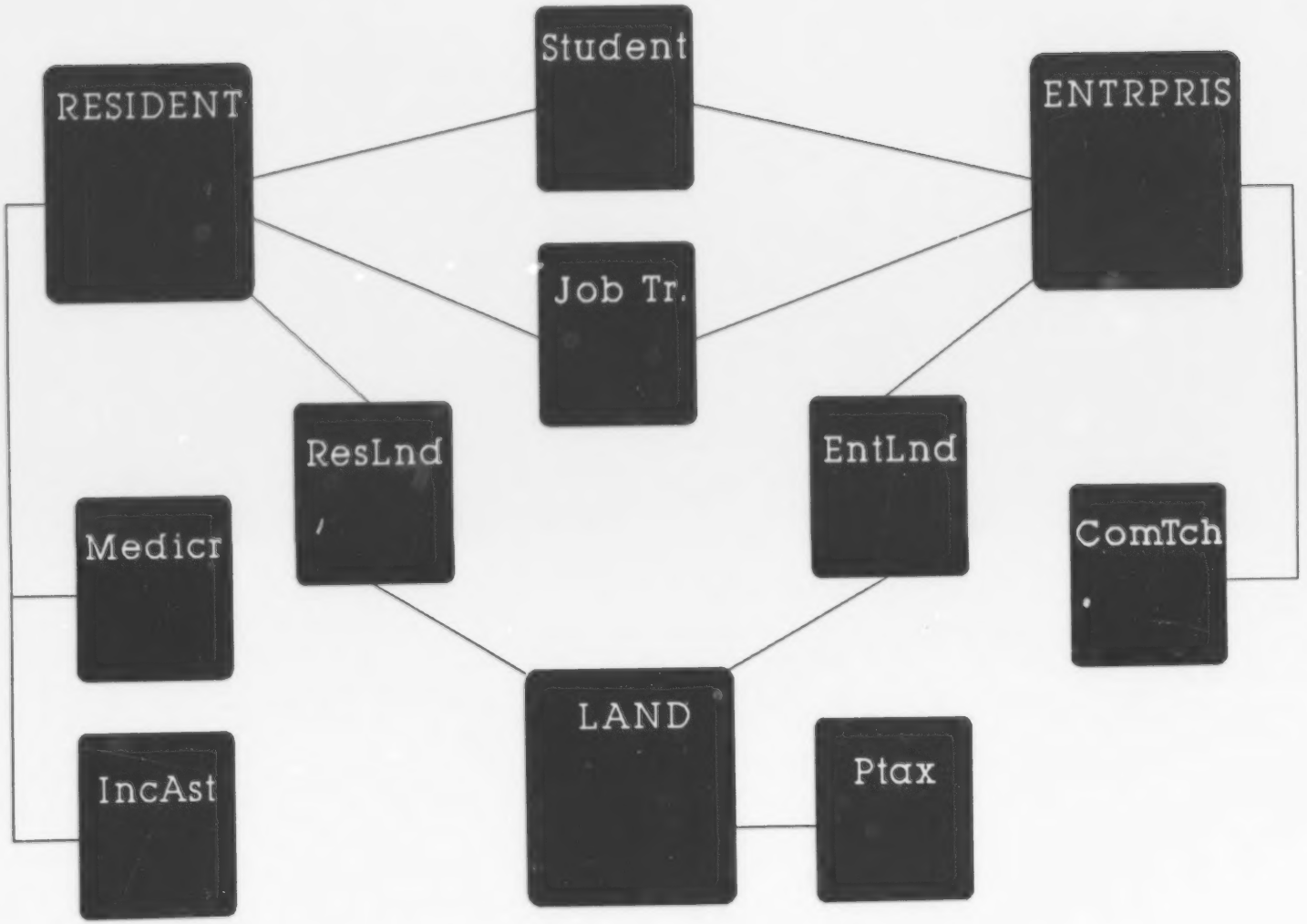
- TO SHOW HOW SOMEONE COULD LINK DIVERSE FILES TO ANSWER THE QUESTIONS WE HAD GATHERED, WE CONSTRUCTED A DEMONSTRATION SYSTEM CONSISTING OF THE THREE MAJOR TABLES CONTAINING BASIC DATA ON RESIDENTS, ENTERPRISES, AND LAND, AND IN THE OTHER TABLES THERE IS PROGRAM RELATED DATA TO ANSWER THESE SPECIFIC QUESTIONS.
- THE CONNECTING LINES ON THE SLIDE REPRESENT TABLE RELATIONSHIPS.
- TO DEVELOP OUR DEMONSTRATION WE CHOSE TO USE A RELATIONAL DATA BASE.
- IN THIS CASE R-BASE ON A MICRO.
- TO GET THE NECESSARY DATA WE ASKED CERTAIN DEPARTMENTS TO SUPPLY US WITH SMALL SAMPLE FILES EXTRACTED FROM THEIR ELECTRONIC FILES.
- NOW I DON'T WANT TO GIVE ANYONE THE IMPRESSION THAT BY PUTTING ALL OF THE GOVERNMENTS DATA ON MICROS AND BUYING A ZILLION COPIES OF R-BASE WE COULD MAGICALLY ANSWER ANY OUT-OF-THE BLUE QUESTIONS!

*** PAGE 7B *** (SLIDE 7 "DEMO SYSTEM")

- SINCE WE ALL KNOW THERE REALLY IS NO MAGIC, IN ORDER TO DO THIS IN REAL LIFE, NOT ONLY WILL THE HARDWARE AND SOFTWARE HAVE TO BE COMPATIBLE BUT SOMEBODY IS STILL GOING TO HAVE TO KNOW WHERE THE NECESSARY DATA COULD BE FOUND AND WOULD HAVE TO HAVE THE MEANS AND AUTHORIZATION TO ACCESS IT.

- BUT UNLIKE THE PRESENT SITUATION, ANSWERS CAN BE OBTAINED QUICKLY WITHOUT WRITING DETAILED PROGRAMS.

CIAP Demo System



*** PAGE 8 *** (SLIDE 8 "QUESTION 1A")

THE FIRST QUESTION WAS MADE UP OF SEVERAL PARTS -

A HOW MANY CHILDREN ARE THERE IN THE CITY OF MONCTON THAT ARE LESS THAN 6 YEARS OLD.

B HOW MANY OF THESE CHILDREN ARE LIVING WITH A SINGLE PARENT.

C HOW MANY OF THESE CHILDREN ARE LIVING WITH BOTH PARENTS WHERE BOTH PARENTS WORK.

D HOW MANY OF THESE CHILDREN NOW ATTEND A DAY-CARE.

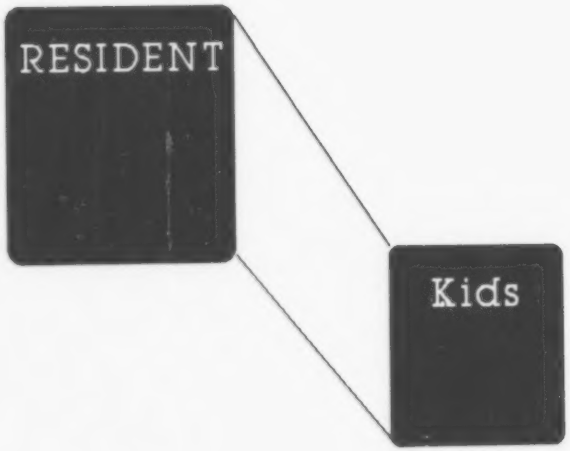
E HOW MANY OF THESE CHILDREN CURRENTLY ATTEND A KINDERGARTEN.

- TO ANSWER PART A WE EXTRACT FROM A FILE OF BASIC INFORMATION ON RESIDENTS, THE GROUP OF INDIVIDUALS THAT MEET THE CRITERIA OF LIVING IN MONCTON AND WHOSE BIRTH DATE IS LESS THAN 6 YEARS AGO.

- THIS EXTRACT GAVE US THE NUMERIC ANSWER TO THE FIRST PART OF THE QUESTION AND CREATED A FILE CALLED KIDS TO BE USED IN THE NEXT PART.

Question 1a

How many children in Moncton are age 0 to 5.

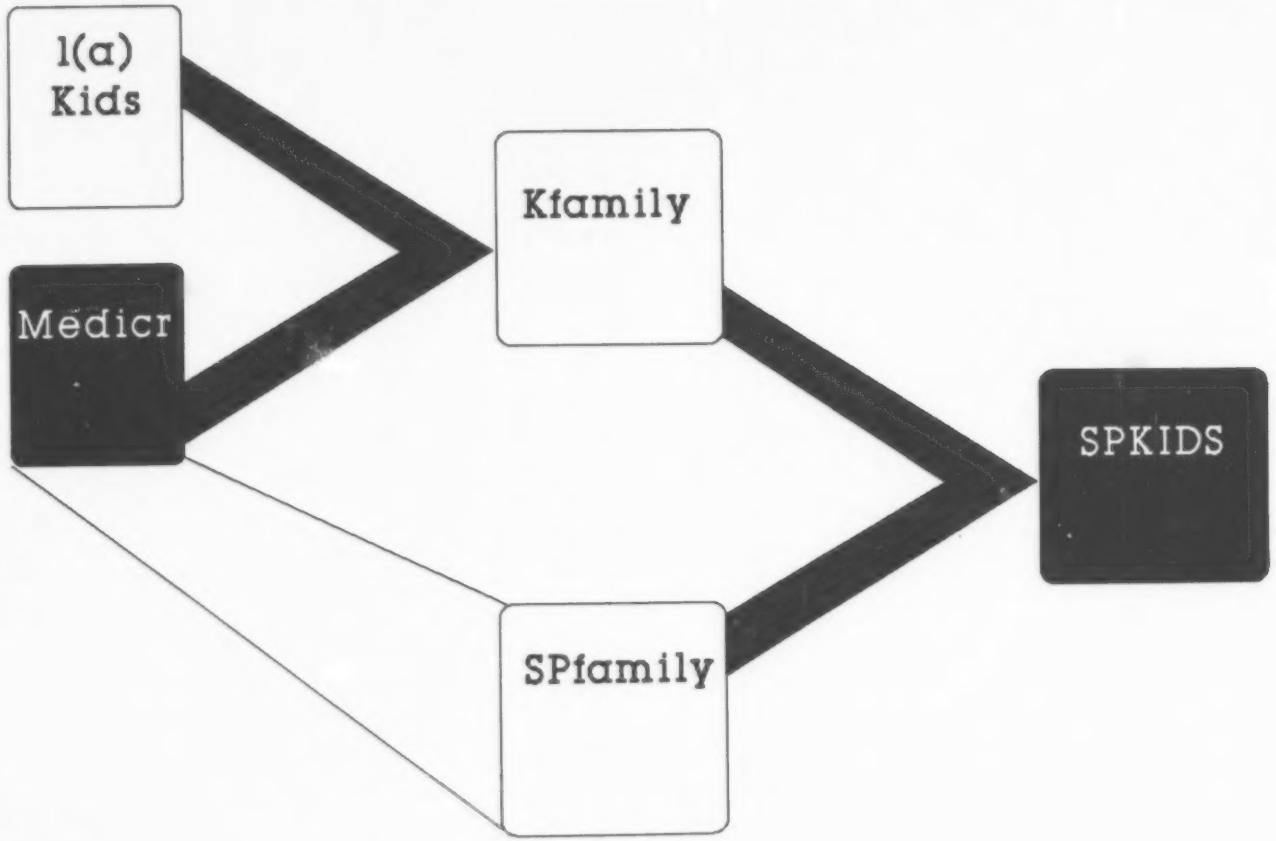


*** PAGE 9 *** (SLIDE 9 "QUESTION 1B")

- ANSWERING PART B ENTAILED MATCHING THE NEWLY CREATED KIDS TABLE WITH THE MEDICARE FILE TO PICK UP THE HOUSE-HOLD ID OF THEIR RESPECTIVE FAMILIES CREATING THE FAMILY TABLE.
- ALSO A FILE OR TABLE OF SINGLE PARENT FAMILIES WAS PROJECTED FROM THE MEDICARE FILE BY USING AN IDENTIFIER THAT DESIGNATES SINGLE PARENT FAMILIES i.e. TABLE SPFAMILIES.
- THE TWO TABLES WERE COMPARED BY HOUSEHOLD ID AND THE RESULTING MATCHING RECORDS WERE PLACED IN THE SINGLE-PARENTS-KIDS TABLE.
- I WANT TO EMPHASIZE THAT ALL THE DATA USED TO ANSWER QUESTIONS LIKE THESE CAN BE PROTECTED IN SUCH A WAY THAT THE INQUIRER WILL SEE NO DATA JUST NUMERIC ANSWERS.
- IF THE DATA HAS NO RESTRICTIONS IT COULD BE DISPLAYED, PRINTED OR CARRIED FORWARD TO ANSWER FURTHER INQUIRIES.

Question 1b

Of these, how many are living with a single parent.



*** PAGE 10 *** (SLIDE 10 "UNANSWERABLE")

THE NEXT THREE PARTS OF THE FIRST QUESTION WERE UNANSWERABLE WITH CURRENT ELECTRONICALLY HELD DATA.

AS IT STANDS IF THE GOVERNMENT IS NOT INVOLVED IN SUPPLYING OR RECEIVING A SERVICE, TO OR FROM A PERSON OR ENTERPRISE, WE DON'T COLLECT ANY RELATED DATA.

ALSO NOT ALL THE DATA WE DO HAVE IS ELECTRONICALLY AVAILABLE.

Question 1c
Where both parents work.

Question 1d
Attend a daycare.

Question 1e
Attend a kindergarten.

*** PAGE 11A *** (SLIDE 11 "QUESTION 2A")

AS FOR THE REST OF THE QUESTIONS, THE METHOD OF CREATING ANSWERS TO THEM ENTAILED MUCH THE SAME TECHNIQUES AS QUESTION 1.

IF ANYONE WOULD LIKE TO SEE THESE IN MORE DETAIL WE WOULD BE GLAD TO SHOW YOU OUR DEMONSTRATION IN THE DEMO AREA AFTER TODAYS PRESENTATIONS.

FOR NOW I WILL JUST SHOW YOU THE QUESTIONS WE USED.

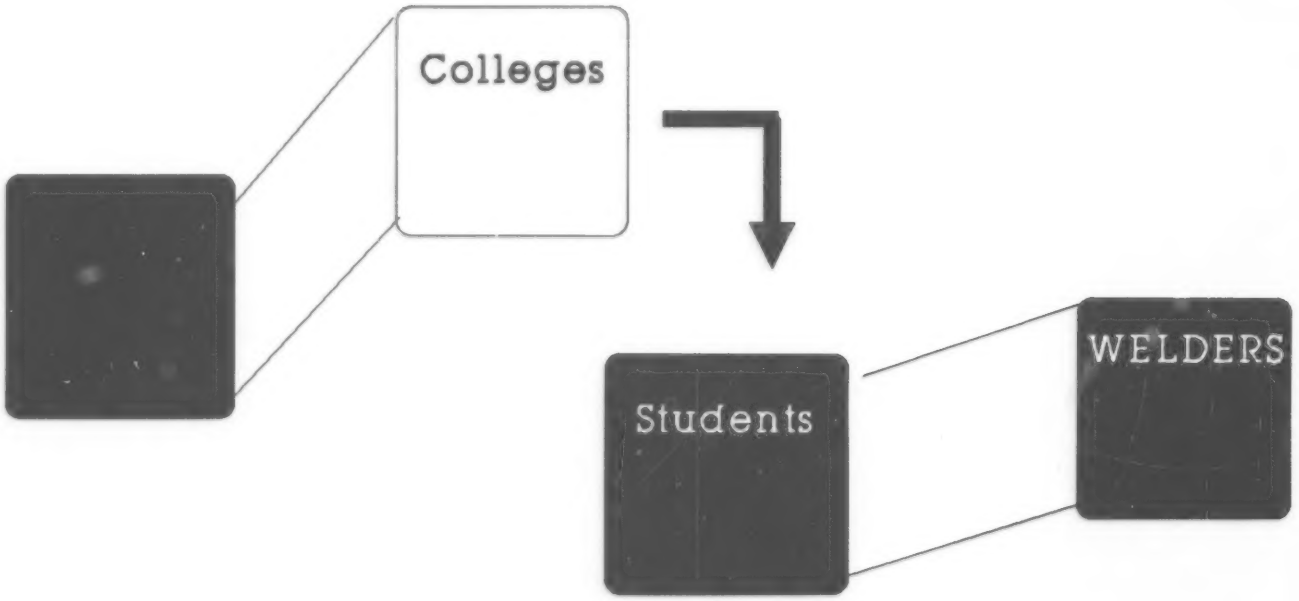
QUESTION 2A - HOW MANY STUDENTS IN MONCTON AND BATHURST COMMUNITY COLLEGES ENROLLED IN THE WELDING COURSE?

***** (SLIDE 12 "QUESTION 2B")**

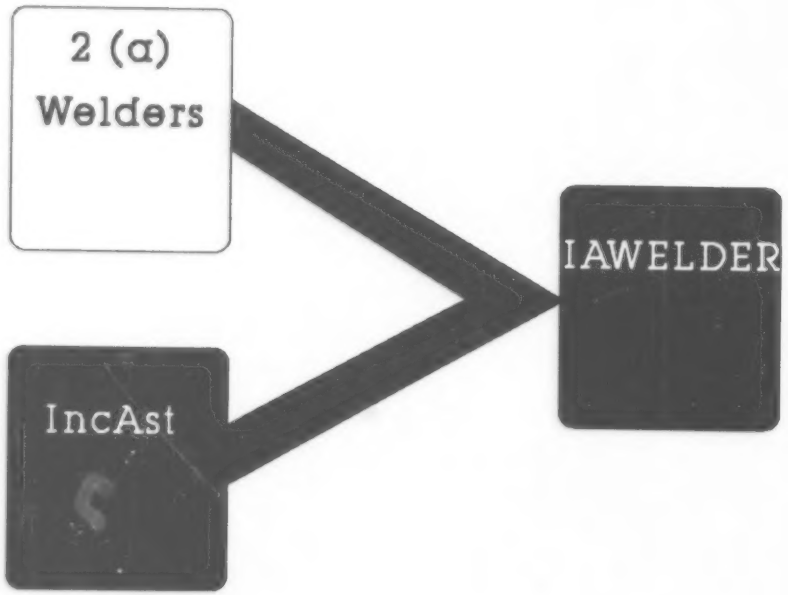
QUESTION 2B - HOW MANY ARE INCOME ASSISTANCE RECIPIENTS?

Question 2a

How many students in Mctn and Bthst Colleges are taking Welding.



Question 2b
How many receive Inc. Assist.



*** PAGE 11B *** (SLIDE 11 "QUESTION 2A")

***** (SLIDE 13 "QUESTION 3A")**

QUESTION 3A - HOW MANY ENTERPRISES THAT RECEIVED FINANCIAL SUPPORT FROM COMMERCE AND TECHNOLOGY IN 1988 ALSO HAD AN OUTSTANDING BALANCE ON PROPERTY TAX PAYABLE TO THE PROVINCE ON DECEMBER 31, 1988?

***** (SLIDE 14 "QUESTION 3B")**

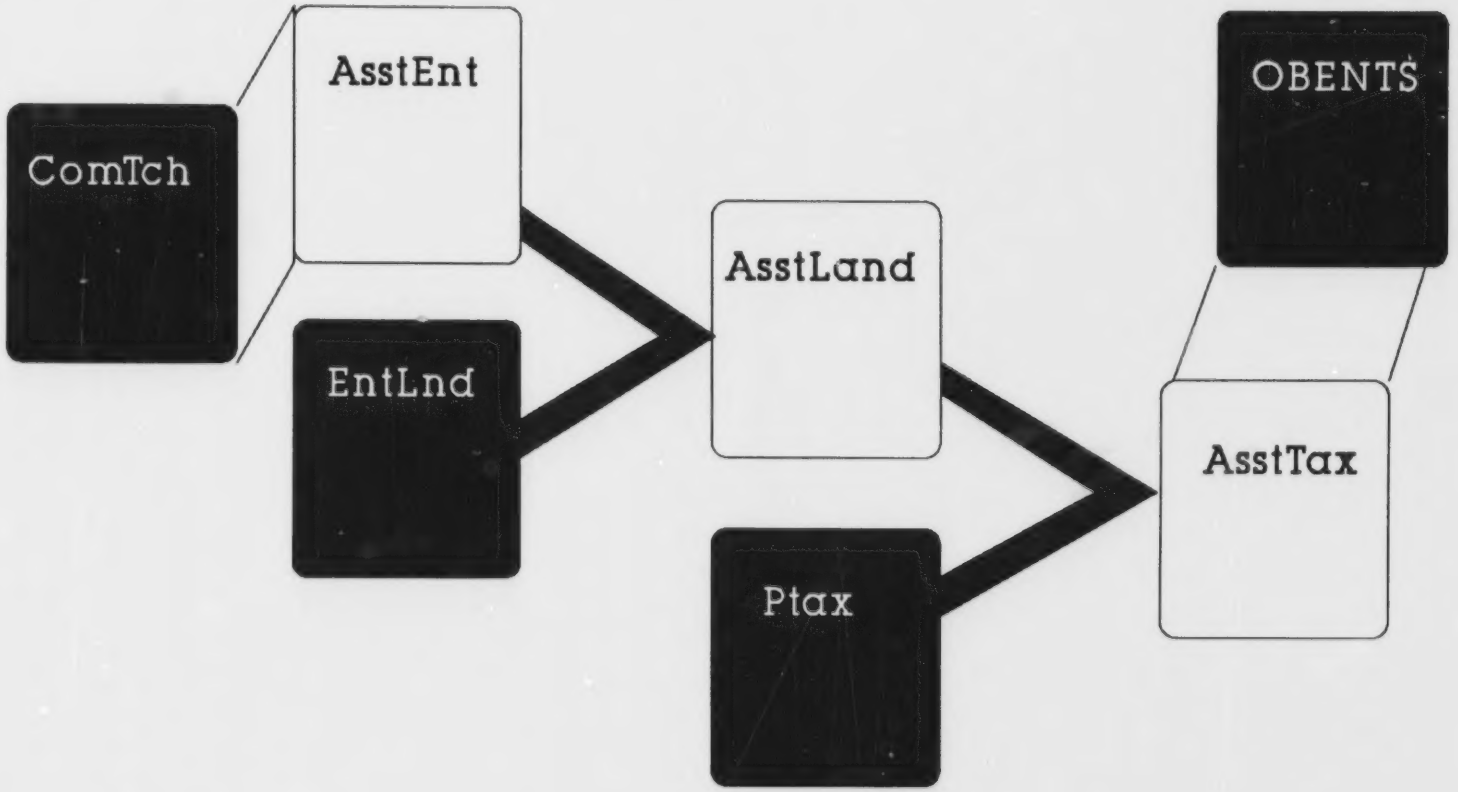
QUESTION 3B - WHAT IS THE DISTRIBUTION OF THOSE ENTERPRISES AMONG TYPES?

***** (SLIDE 15 "QUESTION 4")**

QUESTION 4 - HOW MANY PRIVATE DWELLINGS ARE OWNED BY SENIORS IN NB? (SENIORS MUST RESIDE IN A SINGLE FAMILY OR DUPLEX DWELLING)

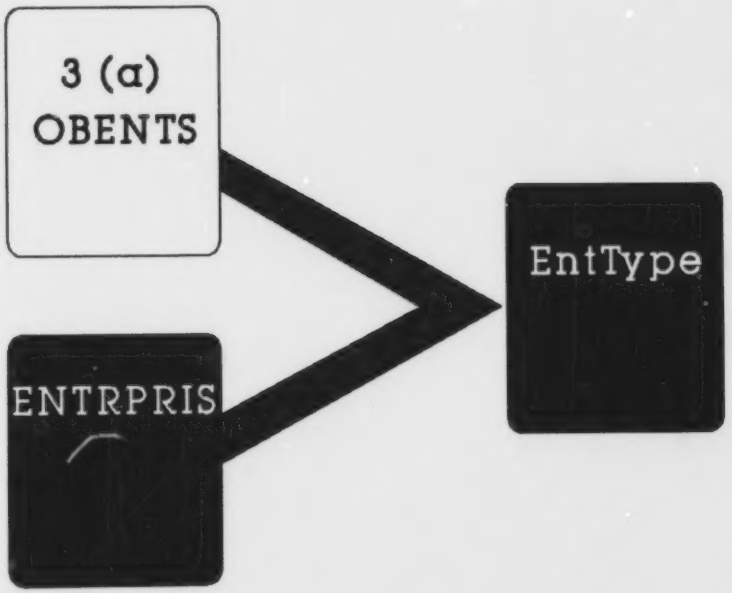
Question 3a

How many enterprises receiving assistance had outstanding balances.



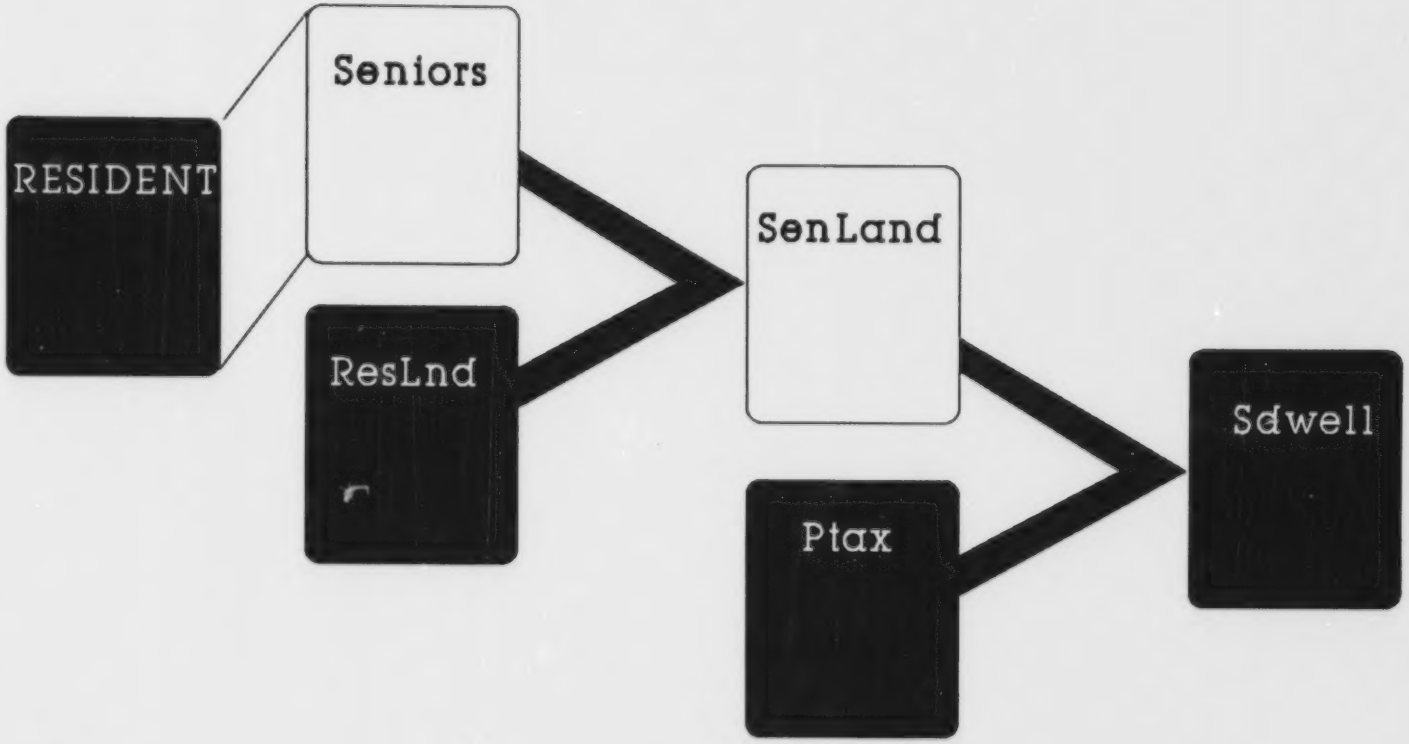
Question 3b

What is the distribution of those enterprises by type.



Question 4

How many private dwellings are owned by seniors in NB.



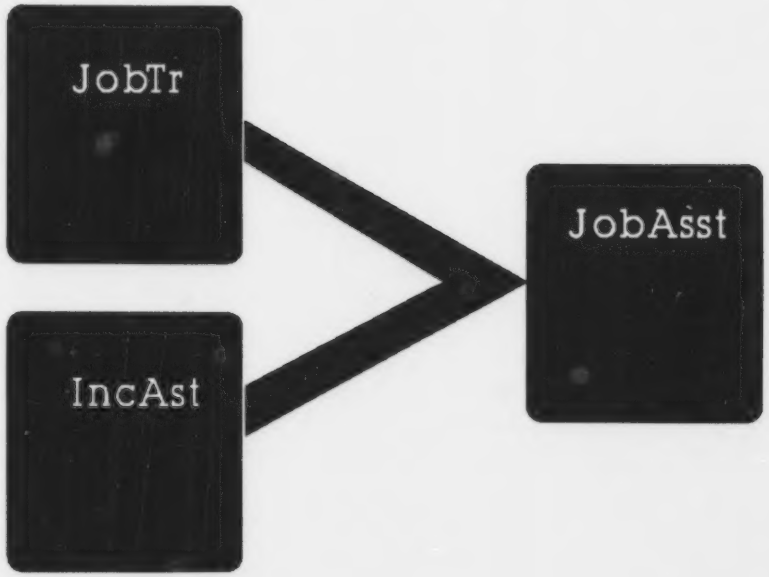
QUESTION 5A - HOW MANY SOCIAL ASSISTANCE CLIENTS WERE ENROLLED IN THE JOBS IN BUSINESS PROGRAM OFFERED THROUGH THE DEPARTMENT OF LABOUR?

QUESTION 5B - HOW MANY OF THESE PERSONS WHERE STILL IN RECEIPT OF SOCIAL ASSISTANCE IN 1988?

THE ABILITY TO ANSWER THESE REPRESENTATIVE QUESTIONS DEMONSTRATES THE POTENTIAL THE DECISION MAKERS OF GOVERNMENT WILL HAVE IN FUTURE AS THE DIFFERENT PIECES OF THE INFORMATION TECHNOLOGY STRATEGY GET IMPLEMENTED.

Question 5 a & b

How many Inc. Asst. recipients enrolled in job training and what is their status.



*** PAGE 13 *** (SLIDE 17 "FINDINGS")

AS A RESULT OF OUR EFFORTS IN DEVELOPING THE DEMONSTRATION AND THROUGH THE INTERVIEW PROCESS THESE FINDINGS EMERGED:

A -- WE FOUND THERE IS NO SINGLE SOURCE OF INFORMATION ON WHO WAS COLLECTING AND STORING WHAT DATA.

SO IF A PROJECT MANAGER NEEDS SOME DATA IT IS EASIER TO COLLECT THE NECESSARY DATA AGAIN THAN TO FIND OUT IF IT ALREADY EXISTS AND WOULD BE AVAILABLE.

**** AS AN ASIDE HERE - NO GOOD DATA PROCESSING PRESENTATION WOULD BE COMPLETE WITHOUT A NEW BUZZ WORD. THE WORD FOR TODAY IS "METADATA" MEANING DATA ABOUT DATA. SO WHAT WE FOUND WAS THERE WASN'T MUCH METADATA AROUND!

*** PAGE 14A *** (SLIDE 17 "FINDINGS")

B -- WE FOUND THERE ARE MANY DIFFERENT FORMATS BEING USED TO STORE BASIC DATA ITEMS LIKE DATE, NAME, ADDRESS.

THIS CAUSED US TO BE UNABLE TO LINK DIVERSE FILES WITHOUT HAVING TO MANUALLY INTERVENE AND ALTER THE DATA.

C -- WE FOUND THAT WHEN IDENTIFIERS ARE USED THEY ARE UNIQUE ONLY TO THE PROGRAM THE DATA WAS COLLECTED FOR AND NOT COMMON ACROSS PROGRAMS.

FOR EXAMPLE WHEN ADVANCED EDUCATION INHERITED PROGRAMS FROM ANOTHER DEPARTMENT BECAUSE OF THE DEPARTMENTS BEING REALIGNED, ALTHOUGH THE FILES CONTAINED SIMILAR DATA THEY WERE DIFFICULT TO LINK BECAUSE DIFFERENT IDENTIFIERS WERE USED.

*** PAGE 14B *** (SLIDE 17 "FINDINGS")

D -- PREVIOUS STUDIES INDICATED THERE WERE MANY INSTANCES OF DUPLICATION IN THE GATHERING AND STORING OF DATA THROUGHOUT GOVERNMENT.

WE ALSO FOUND THIS TO BE TRUE AND WITH THE TREMENDOUS GROWTH IN DEPARTMENTAL COMPUTING, THIS DUPLICATION IS INCREASING.

ALTHOUGH DUPLICATION OF DATA IS NOT NECESSARILY BAD IN ALL CASES, IT BECOMES DIFFICULT TO DETERMINE WHICH SOURCE IS THE MOST ACCURATE, COMPLETE, AND CONTAINS THE CURRENT FACTS.

FINDINGS

- LITTLE INFORMATION ON DATA
- MULTIPLE DATA FORMATS
- REDUNDANT IDENTIFIERS
- DUPLICATE DATA

*** PAGE 15A *** (NEW SLIDE 18 "RECOMMENDATIONS")

- SINCE THE INFORMATION TECHNOLOGY STRATEGY STATES THAT DATA SHARING IS A DESIRABLE GOAL, AND OUR OBJECTIVE WAS TO IDENTIFY MECHANISMS THAT WOULD HELP ACHIEVE THIS, I WOULD LIKE TO PRESENT TO YOU THE FOLLOWING FOUR RECOMMENDATIONS LISTED IN ORDER OF PRIORITY:

1 - THE CREATION OF AN ELECTRONIC INVENTORY OF THE STRATEGIC DATA HOLDINGS OF GOVERNMENT.

THIS WOULD INCLUDE THE DATA HELD ON MAINFRAME, MINI, AND SOME P.C. SYSTEMS.

WE FEEL THIS IS THE FIRST STEP IN ASSISTING DATA SHARING, SETTING STANDARDS, AND AVOIDING DUPLICATION.

*** PAGE 15B *** (NEW SLIDE 18 "RECOMMENDATIONS")

2 - USING THE FINDINGS OF THE ABOVE INVENTORY AS A BASE, REVIEW AND ESTABLISH STANDARD FORMATS FOR DATA, TO BE ADOPTED OVER TIME BY ALL GOVERNMENT SYSTEMS.

THIS WOULD HELP WITH THE MATCHING OF DATA FROM DIFFERENT FILES.

3 - TO FACILITATE DATA SHARING BY LINKING DIVERSE DATA FILES, THE ABILITY TO IDENTIFY THE SAME SUBJECT IN THESE DIFFERENT FILES IS A MUST.

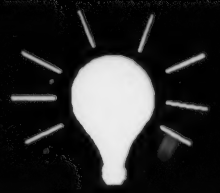
THEREFORE WE ARE RECOMMENDING THE ADOPTION OF UNIQUE KEYS FOR RESIDENTS AND ENTERPRISES SIMILAR TO THAT WHICH HAS BEEN ADOPTED FOR LAND PARCELS.

*** PAGE 15C *** (NEW SLIDE 18 "RECOMMENDATIONS")

4 - THE LAST RECOMMENDATION IS THE ADOPTION OF THE PRINCIPLE OF CREATING SINGULAR LOGICAL DATA-BASES FOR THE THREE MAJOR DATA DOMAINS - RESIDENTS, ENTERPRISES AND LAND.

THIS IS THE PRINCIPLE THAT SETS THE DIRECTION FOR THE FUTURE AND WILL ALLOW US TO ACHIEVE DATA SHARING THROUGHOUT THE ORGANIZATION.

REALIZING THAT IT WOULD BE EXPENSIVE AND TIME CONSUMING TO TRY TO IMPLEMENT ALL OF THE RECOMMENDATIONS AT ONCE WE ENVISION MOST WILL HAVE TO BE IMPLEMENTED OVER TIME AS NEW SYSTEMS ARE DEVELOPED OR OLD ONES REPLACED.



RECOMMENDATIONS

- ELECTRONIC DATA INVENTORY
- DATA FORMAT STANDARDS
- UNIQUE IDENTIFIERS
- PRINCIPLE OF SINGULAR DATABASES FOR BASIC DATA

*** PAGE 16 *** (NEW SLIDE 19 --- NEXT STEP)

- THIS REPORT WAS GIVEN TO THE INFORMATION TECHNOLOGY STRATEGY STEERING COMMITTEE AND THESE RECOMMENDATIONS WERE ADOPTED IN PRINCIPLE.
- SO THE NEXT STEP FOR THIS PROJECT IS THE DEVELOPMENT OF A DETAILED PROJECT PROPOSAL, HIGHLIGHTING THE APPROACH, RESOURCES AND COSTS NEEDED TO CONSTRUCT AND IMPLEMENT AN ELECTRONIC DATA INVENTORY SYSTEM.
- THIS SYSTEM WILL ALLOW THE GRADUAL COMPILATION OF ALL GOVERNMENT DATA HOLDINGS AND WILL BE ACCESSIBLE BY ALL DEPARTMENTS.
- I WOULD LIKE TO TAKE THIS OPPORTUNITY TO THANK ALL THE PEOPLE WHO WE INTERVIEWED AND DISCUSSED THIS PROJECT WITH, ALSO A SPECIALS THANKS TO ISG FOR TECHNICAL SUPPORT AND THE STEERING COMMITTEES FOR DIRECTION. I WOULD LIKE TO REMIND YOU THAT WE WILL BE AVAILABLE TO SHOW OUR DEMONSTRATION SYSTEM AND DISCUSS THE PROJECT AFTER TODAYS PRESENTATIONS.

NEXT STEP

Detailed Definition

For Data Inventory Project

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 16, 1990

CORPORATE TECHNICAL ARCHITECTURE

by

Charlie Chaisson
Systems & Technology
Supply and Services

INTRODUCTION:

Just to put things in perspective, this presentation is about the second major component of the NB government technology strategy, technical architecture. It has to do with enabling technologies.

The views I express today have been accepted by the deputies steering committee but do not necessarily represent the immediate business plan of ISG. There is a significant difference between a vision and strategy for the future, and the day-to-day operational requirements of central MIS.

AGENDA:

For agenda for this presentation on the governments trial technical architecture consists of the items you see here.

Basically, I would like to illustrate some of the trends occurring in the industry, and what vision of the future these trends seem to be leading us to.

For those who accept that vision of the future and wish to participate, it will be necessary to have standards and a migration strategy for arriving at the target environment. The recommendations presented here reflect some of the current thinking on specific technology choices that appear to be strategic. It is recognized, however, that a strategy does not dictate each and every tactical decision.

TRENDS--DISTRIBUTED POWER:

It is fairly self evident that desktop processing power is growing at ever increasing rates. But just to put things in perspective I offer two charts and some additional commentary.

Looking at PC MIPS (millions of instructions per second), we have gone from about 1/2 MIP in the early eighties to 1.5 MIPS in 1985 and 4.5 MIPS in 1990. It is very conservative to estimate 20 MIPS will be commonplace within 5 years. IBM recently announced a 30 MIP machine for $15,000.00. Extreme estimates include 250 MIPS by 1993 and 1000 MIPS by 1999.

Looking at mass storage (measured in megabytes), we have gone from less than 1 MB in the early eighties to 40 MBs in 1985 and 80 MBs in 1990. The low bid economy 386 last year included an 80 MB drive . It is very easy to accept that 200 MB hard drives will be commonplace by 1995.

One final point, lest anyone still have doubt, the total PC's in government represent approximately 2000 MIPS and 60 GB of data. The governments mainframe installation represents about 25 MIPS and 45 GB of data. So processing power is already distributed and data less so.

The dilemma posed by this distribution of power is how best to harness this potential in the best interests of the NB government. It is clear we must find a way to hook these computers together so that optimal advantage is gained.

THE VISION--ANY DATA VIEW:

Previous government studies have indicated there are four views of data and/or processing requirements. These are personal, workgroup, departmental, and corporate. An ideal solution to the dilemma posed in the previous slide would allow any higher view of the data to be taken merely by aggregating a sufficient number of lower level views. For instance, individual workers may have tables of client information on each PC, and a supervisors summary view would be gained by aggregating the PC data from each of the individuals PC's. Similarly, a departmental view would aggregated each supervisors view or all of the individuals views. Clearly, the same approach applies to government wide views. For instance, what services have we given to a specific individual.

It should be noted that the data architecture studies indicate three primary entities where this sort of data sharing would be important. These are people , enterprises and land. It is difficult to think of government applications not dealing with one of these entities, but presumably in such a case, this technical architecture is less critical.

For my own part, I believe that it is not necessary and is very difficult to incorporate personal computers in this vision until multitasking operating systems are being used. However, it is important to make sure that the next level higher (ie workgroup) does indeed participate when it is implemented using a single platform.

THE CLIENT SERVER MODEL:

I think it is evident from the previous slide that networked computers must be able to interact to provide the various views. A generalized model for any two computers interacting is represented in this diagram. This model is often referenced in the trade press, but sometimes by other names and sometimes incorrectly.

Basically, an application on one computer makes a database request. If the data resides on the same computer, then it is simply retrieved via operating system calls. If the data does not reside on the requesting computer, then the request is sent out over the network to the computer that does have the data. The DBMS of the second computer processes the request and returns the result to the first computer.

Notice that it should not matter whether the network is local or wide area. Also, this mode of operation is different from traditional file sharing systems where entire files must be moved to be processed. This is particularly important when data from large mainframe files is required.

STANDARDS--OPEN SYSTEMS:

The client server model requires standards be implemented on participating computers so that interoperability may be accomplished. There are two choices for implementing standards, vendor specific or vendor independent. For instance, we could all agree to adhere to IBM proprietary products, or we can accept any product as long as it plays by the rules. Fortunately, considerable progress has been made in both cases. However, since there are already many different types of computers within government, we have little choice but to adopt vendor independent standards. The US federal government has done considerable work in specifying vendor independent standards and these are collectively known as open systems.

Specifically, three major specifications have been published for the US government. These are APP (Applications Portability Profile), POSIX (Portable Operating System Interface definition), and GOSIP (Government Open Systems Interconnection Profile). Together these provide a comprehensive set of tools for implementing open and distributed systems.

The concept of open systems has been approved by the deputies technology steering committee and the CIRO has issued corresponding recommendations derived from the three major specifications.

APP AND POSIX RECOMMENDATIONS:

Leaving network protocols aside for the moment, some of the main recommendations are shown on this slide. Under the product column, I have included items that are suggestions ONLY in brackets. In cases where we don't even have a suggestion, I have indicated that situation with a question mark. The remaining items are specific recommendations.

Probably the most controversial part of this technical architecture is the recommendation for Unix with Sun's NFS and RPC. At the time, this was the most widely available technology for implementing both file server and the client server model on multiple platforms. This remains true today and in a few moments I'll show you how other network platforms are also moving in this direction. First, though I want to show you the GOSIP recommendations so that you can see how the US federal government will eventually arrive at ISO open systems standards.

GOSIP RECOMMENDATIONS:

The Government Open Systems Profile specifies a strategy for moving from previous defacto standards to International Standards Organization standards.

I have attempted to show this diagrammatically on this slide. Rather than attempt to talk about protocols and such, I believe the important point to make is that ISO standards will all most certainly take into consideration existing defacto standards. Since ISO standards are not completely in place, it is important to solve todays problems with technologies that offer a migration path. It should be pointed out however, that a two step migration is not intended if your platform already has a migration path to open systems.

Taken literally, GOSIP would appear to suggest that all local and wide area networks should be TCP/IP based. While this could be an appropriate strategy, it certainly can't be exclusive given the widespread existence of other LAN technologies. Fortunately, it does appear that these other LAN technologies are moving towards the same higher level standards so that low level protocols need not be of concern.

NETWORKS OS'S - MARCH 1989:

A year ago, when the technical architecture was first drafted, the LAN situation basically consisted of 3 choices in the area of client/server interoperability, namely:

Sun's Remote Procedure Call (RPC) technology.
OS/2 Lan Manager Server Message Block (SMB) technology.
Novell's NetWare Core Protocol (NCP) technology.

At the time, the only one that appeared to be available for all platforms was Sun's RPC technology. This was primarily due to the wide availability of UNIX, but RPC is available for other OS's as well. Since that time, significant announcements have been made which indicate that Microsoft and Novell are supportive of the client/server model in a broader way.

NETWORK OS' - MARCH 1990:

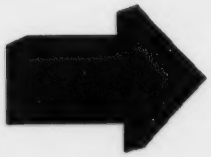
For the Unix operating system, Microsoft has released LM/X. This will make available the SMB protocol to applications developers on Unix platforms. This is a move in the right direction but currently LM/X can only be accessed by clients and cannot be a client.

Another product released for the Unix platform is Portable Netware. The goal o this product is to make the NCP protocol, SMB protocol and RPC protocol available in a transport independent fashion. Currently, Unix clients access Portable Netware as if it were Sun's NFS.

The dilemma still remains, however, which client/server protocol will be standard. As it turns out, the vendors of network OS's have also recognized this impediment and made even further announcements. Both Microsoft and Novell have announced support for RPC technology. To what degree this will actually come about remains to be seen. While we wait for the market to sort itself out, we have to carry on implementing solutions to todays problems. As many of you know, my money would go towards Unix based solutions as that world has a head start in connecting incompatible hardware.

NB GOVERNMENT
INFORMATION TECHNOLOGY STRATEGY

Data Architecture



Technical Architecture

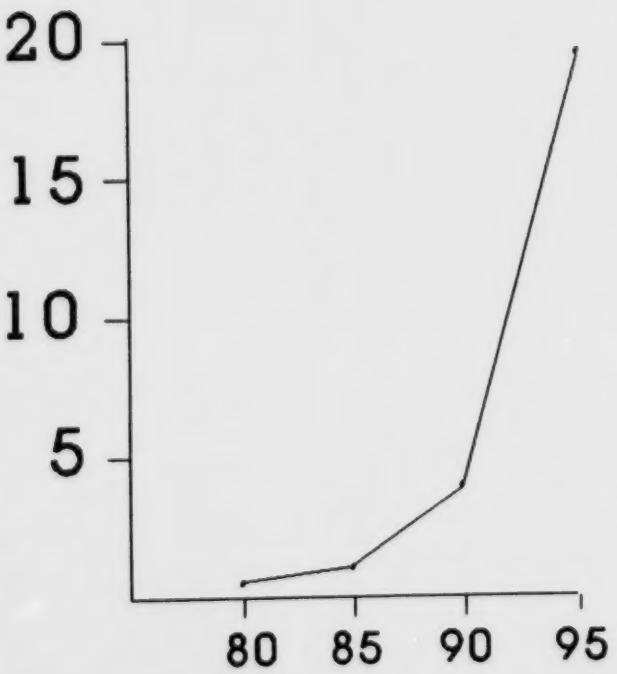
Software Standards

TECHNICAL ARCHITECTURE

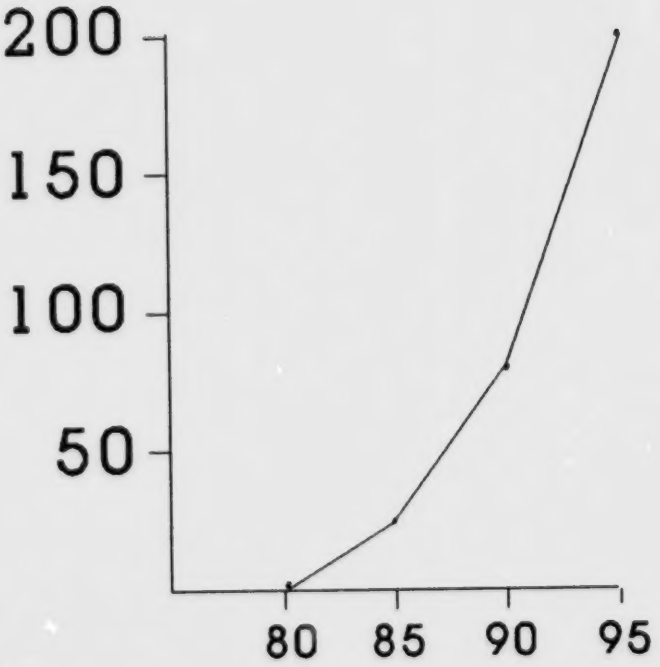
AGENDA

- ✓ 1. The Trends
- ✓ 2. The Vision
- ✓ 3. The Standards
- ✓ 4. Recommendations

Trends : Distributed Power

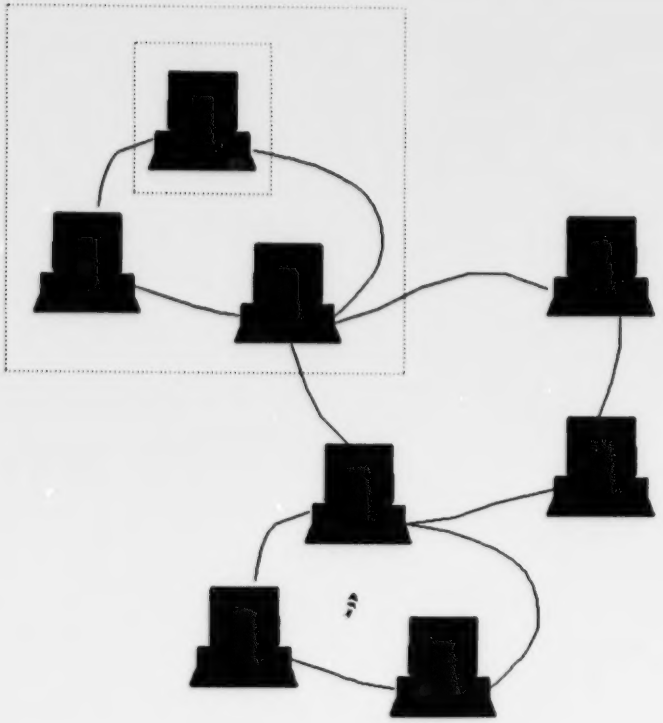


PC MIPS



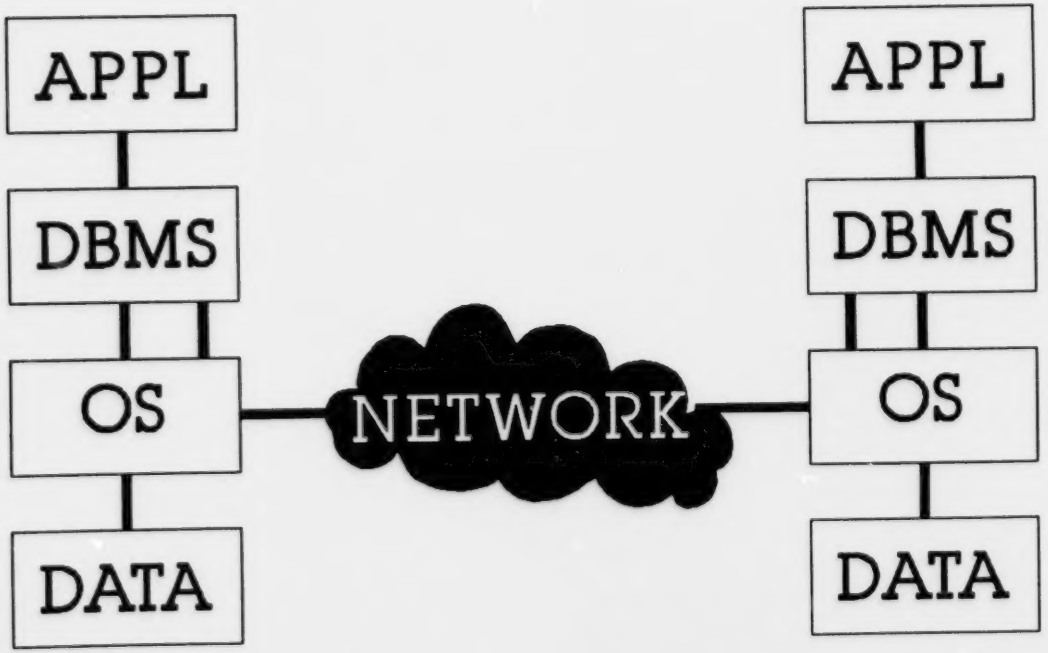
PC MBs

The Vision: Any Data View

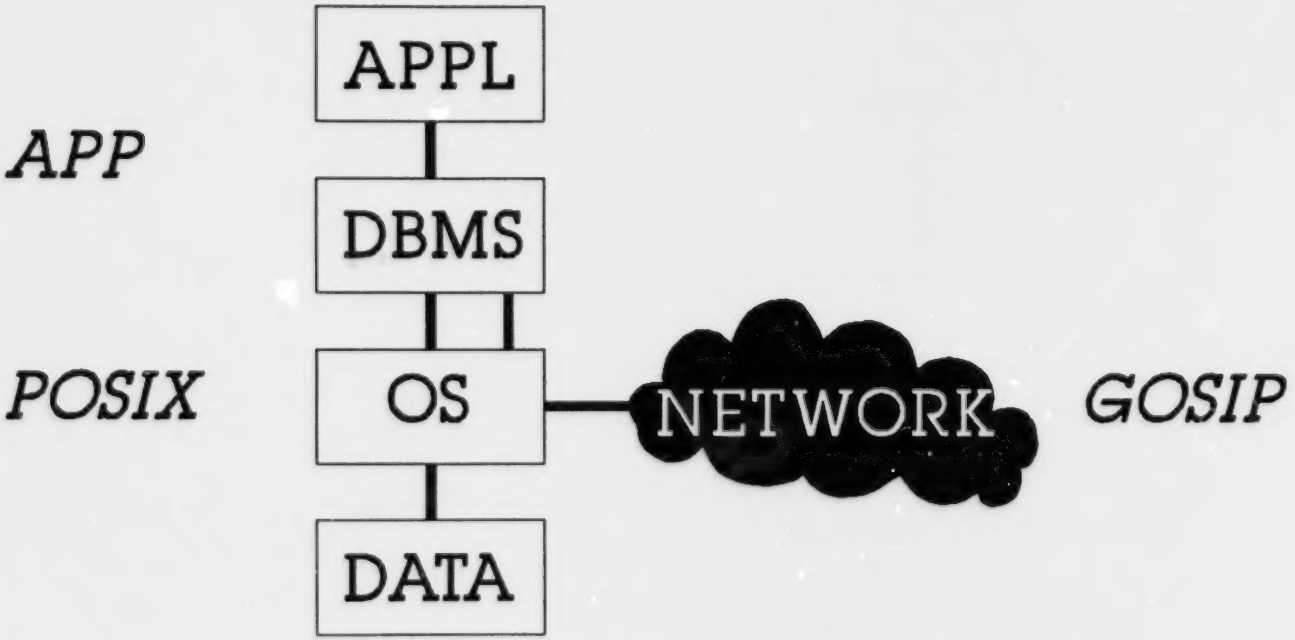


PERSONAL
WORKGROUP
DEPARTMENTAL
CORPORATE

The Client / Server Model



Standards : Open Systems



Recommendations

APP
POSIX

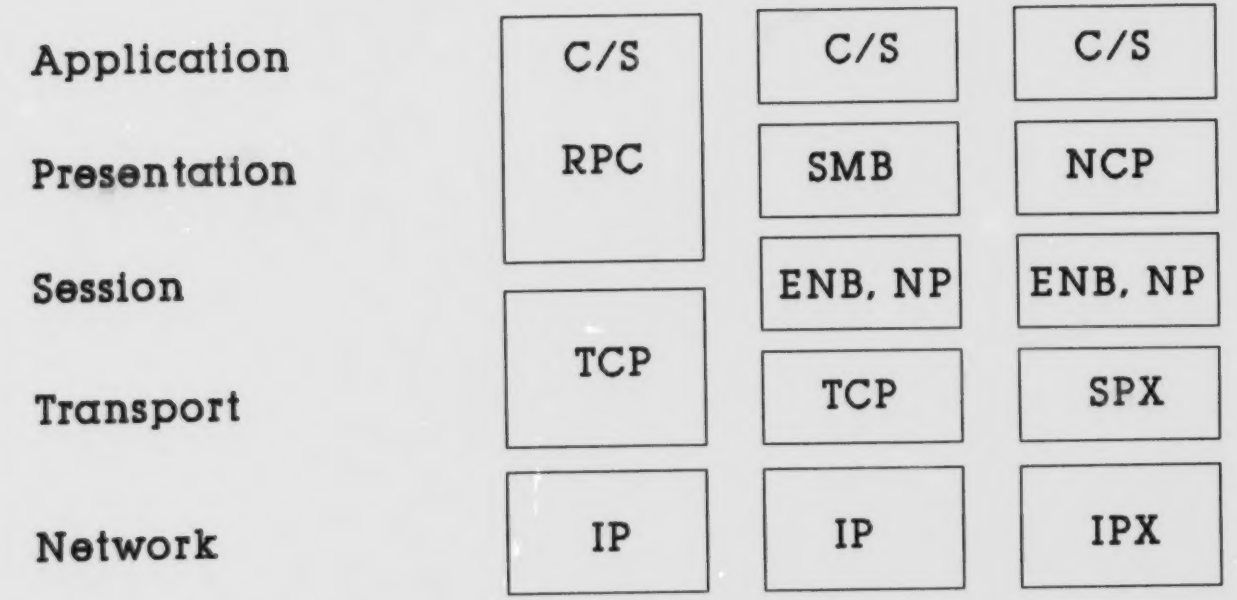
FUNCTION	SPECIFICATION	PRODUCT
Interface	X Windows	(OpnLk/Motif)
Email	X.400 (MHS)	?
Exchange	ODIF, CGM	?
File Share	NFS/RPC	NFS
DBMS	SQL/REL	(Oracle/Ingres)
OS	POSIX	UNIX Sys V

Recommendations

GOSIP

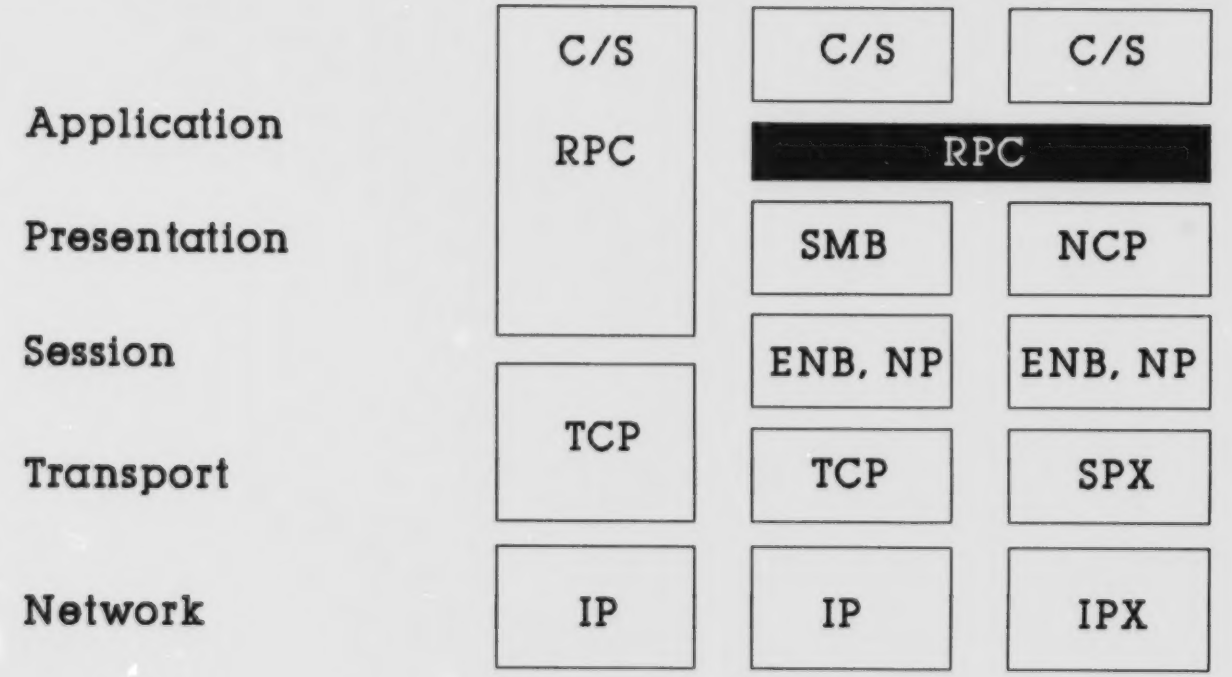
	ARPANET	ISO
Application	SMTP FTP	X.400 FTAM
Presentation		ACSE
Session		BAS BSS
Transport	TCP	TP 2,4
Network	IP	CONP CLNP
Data Link	802.2 LLC	X.25
Physical	802.3 ENET	

Network Operating Systems



MARCH '89

Network Operating Systems



MARCH '90

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 17, 1990

NBGIC
NEW BRUNSWICK GEOGRAPHIC INFORMATION CORPORATION

by

W. A. PERT
Vice President, Operations

THE NEW BRUNSWICK GEOGRAPHIC INFORMATION CORPORATION

- CONCEPTION

- DEVELOPMENT

- BIRTH

- GROWTH

CONCEPTION

- NB HAS EXTENSIVE INVOLVEMENT IN THE MANAGEMENT OF GEOGRAPHIC INFORMATION

  IMPRESSIVE CAPABILITIES

  - LRIS
  - SURVEYING ENGINEERING AT U.N.B.
  - D.N.R. TIMBER MANAGEMENT
  - MUNICIPAL AFFAIRS - PATS

- GOVERNMENT RECOGNIZED THE IMPORTANCE OF GEOGRAPHICAL INFORMATION

  PROMINENT ON AGENDA

  *SLIDE #1

- NO SINGLE ORGANIZATION RESPONSIBLE
- RECOGNIZED NEED FOR COHERENCE
- MARCH 1989 - LAND INFORMATION POLICY
  - To provide coherence to gov'ts GIS efforts
  - Framework for connecting gov'ts efforts with private sector & educational institutions

SLIDE #2

PROVINCE OF N.B.

LAND INFORMATION POLICY

POLICY

1. EXCEPT AS OTHERWISE RESTRICTED BY LEGISLATION OR PRIVACY REQUIREMENTS, ALL LAND RELATED INFORMATION COLLECTED AND STORED BY DEPARTMENTS AND AGENCIES OF GOVERNMENT SHALL BE MADE AVAILABLE TO ANY WHO REQUEST IT, AT A COST RELATED TO SUCH PROVISION.

*2. THE DISSEMINATION OF GEOGRAPHICALLY RELATED INFORMATION WILL BE USED AS A VEHICLE TO PROMOTE ECONOMIC ACTIVITY IN THE PRIVATE SECTOR.

*3. DEPARTMENTS AND AGENCIES OF GOVERNMENT WILL GENERALLY MEET THEIR LAND RELATED INFORMATION NEEDS BY SUPPORTING THE PRIVATE SECTOR THROUGH CONTRACTING OUT.

4. STANDARDS FOR RECORDING, MANAGING, DISTRIBUTING AND INTERCONNECTING GEOGRAPHICALLY RELATED INFORMATION WILL BE DEVELOPED AND ADOPTED.

5. EFFORTS RELATED TO DEVELOPING THESE STANDARDS WILL INVOLVE GOVERMENT, PRIVATE SECTOR AND EDUCATION INSTITUTIONS.

6. THE GOVERNMENT OF NEW BRUNSWICK WILL ADHERE TO AND BE A STRONG SUPPORTER OF THE STANDARDS DEVELOPED. THE FIRST THREE STANDARDS ADOPTED BY THIS POLICY ARE:

   A) THE LRIS PARCEL INDENTIFIER IS THE STANDARD FOR IDENTIFYING LEGAL PARCELS OF LAND.

   B) THE LRIS BASE MAPPING SPECIFICATIONS IS THE BASE UPON WHICH ALL GEOGRAPHIC INFORMATION WILL BE BUILT.

   C) CARIS IS THE SOFTWARE FOR MANAGING GEOGRAPHIC INFORMATION.

SLIDE #3

PROVINCE OF N.B.
LAND INFORMATION POLICY

OBJECTIVES

1. TO IMPROVE AVAILABLE INFORMATION SERVICES TO THE PUBLIC;

2. TO IMPROVE THE INFORMATION USED TO MANAGE OUR NATURAL RESOURCES AND THE ENVIRONMENT;

3. TO ELIMINATE DUPLICATION OF GEOGRAPHIC INFORMATION MANAGEMENT ACTIVITIES;

4. TO INCREASE THE AMOUNT OF INFORMATION AVAILABLE TO MANAGE OUR RESOURCES;

* 5. TO ENHANCE THE JOB CREATION OPPORTUNITIES RELATED TO GEOGRAPHIC INFORMATION SERVICES; AND

* 6. TO TRANSFER TO THE PRIVATE SECTOR AS MANY GEOGRAPHIC INFORMATION ACTIVITIES (AND JOBS) AS POSSIBLE.

IMPLEMENTATION

GEOGRAPHICAL INFORMATION SERVICES CAN SERVE TWO MAJOR OBJECTIVES:

1. IMPROVED MANAGEMENT OF THE NATURAL RESOURCES AND ENVIRONMENT

2. ECONOMIC GROWTH

TO FOCUS ON THESE TWO OBJECTIVES:

1. CREATE N.B.G.I.C.

2. MINISTER OF COMMERCE AND TECHNOLOGY RESPONSIBLE

DEVELOPMENT

1. DISCUSSION PAPER
   - TABLED IN LEGISLATURE, APRIL 1989
   - REQUESTED SUBMISSIONS TO THE SPECIAL LEGISLATIVE COMMITTEE ON ECONOMIC POLICY DEVELOPMENT

2. LEGISLATIVE REVIEW
   - 9 BRIEFS SUBMITTED
     1. GEOPLAN CONSULTANTS INC.
     2. H.G. GREEN SURVEYS LTD.
     3. CITY OF SAINT JOHN
     4. ASSOC. OF N.B. LAND SURVEYORS
     5. LA SOCIÉTÉ DES ACADIENS DU N.-B.
     6. N.B. LAND INFORMATION COUNCIL
     7. APPRAISAL INSTITUTE OF CANADA INC
     8. BEAUBASSIN PLANNING COMMISSION
     9. GUY DÉCARIE

- GENERALLY POSITIVE

3. RECOMMENDATIONS

- AGREED WITH CONCEPT

4. TABLED LEGISLATION - NOVEMBER 1989

5. ASSENTED TO LEGISLATION - NOVEMBER 1989

BIRTH

- ACT PROCLAIMED MARCH 31, 1990

- PROGRAM RESPONSIBILITY - SLIDE #4

- LEGISLATIVE RESPONSIBILITY - SLIDE #5

- PRESIDENT APPOINTED, MAY 14, 1990

- CROWN CORPORATION

  - PART I

  - BUSINESS ORIENTATION

A Crown Corporation model has been chosen for a number of reasons. Enhancing job creation opportunities related to geographic information services and transferring to the private sector as many geographic information activities as is feasible are important thrusts for the Corporation. It will be encouraged to enter partnerships with the private and university sectors and assist in marketing New Brunswick expertise in geographic information services on an international basis. Ensuring that New Brunswick stays at the leading edge of GIS technology by cooperating in the development of new information services and products is another priority. A Crown Corporation model will provide the agency with a business orientation, revenue incentive and flexibility not normally present in a government department model.

Establishment of a Crown Corporation will offer the Government of New Brunswick other important advantages:

- Full control by government over policy, administration and standards will be maintained;
- Staff will be employed within the framework of the public service;
- Requirements to maintain public records will be satisfied;
- Structure and control of the Corporation will be tailored to the requirements of its operation; and
- Separate budgeting and project accounting will be established.

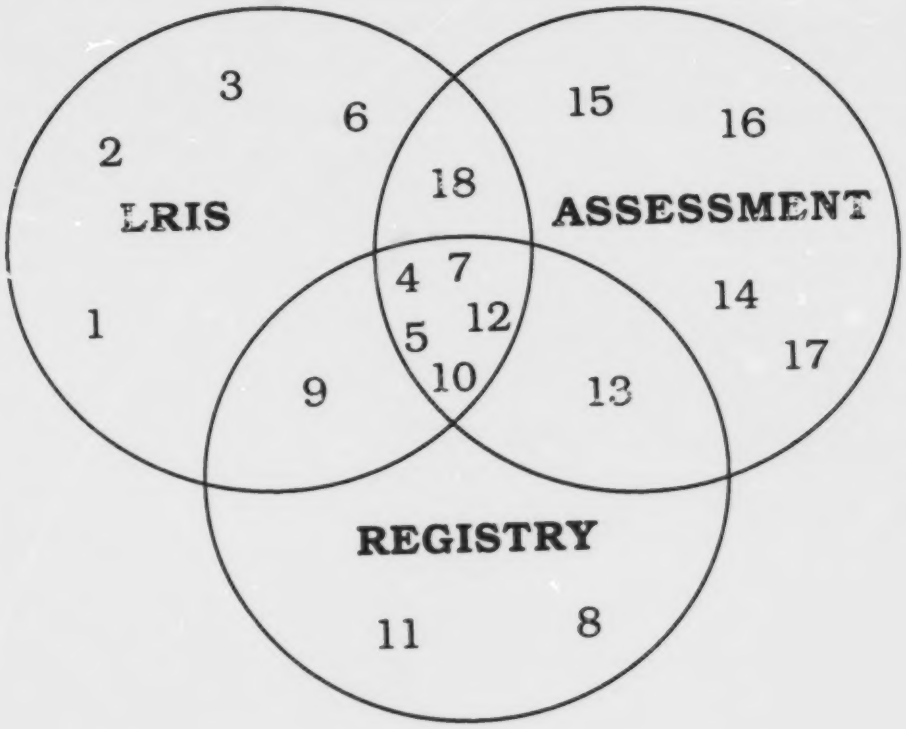
GROWTH

1. BOARD OF DIRECTORS – NOT YET
   9-11
   Private sector
2. BUSINESS PLAN
3. INFORMATION SYSTEMS STRATEGY
4. ORGANIZE FOR INTEGRATION OF ACTIVITIES

SLIDE #6

#1

G.I.C. → Integration of basic land information systems



TYPE OF LAND INFORMATION

1 Aerial Photography
2 Survey Control
3 Base Maps
4 Property Maps
5 Parcel Index Files
6 Map Distribution
7 Deeds
8 Chattels
9 Incumbrances
10 Subdivision Plans
11 Corporation Registry
12 Land Titles
13 Property Values
14 Property Improvements
15 Building Information
16 Market Analysis
17 Appraisals
18 Maps / P. A. T. S.

#2

PROVINCE OF N.B.
LAND INFORMATION POLICY

POLICY

1. INFORMATION IS AVAILABLE AT A COST.

2. INFORMATION A VEHICLE FOR ECONOMIC GROWTH.

3. SUPPORT THE PRIVATE SECTOR.

4. STANDARDS WILL BE DEVELOPED:

   A. LRIS PARCEL IDENTIFIER.
   B. LRIS BASE MAPS.
   C. CARIS.

#3

PROVINCE OF N.B.
LAND INFORMATION POLICY

OBJECTIVES

1. TO IMPROVE AVAILABLE INFORMATION SERVICES TO THE PUBLIC;

2. TO IMPROVE THE INFORMATION USED TO MANAGE OUR NATURAL RESOURCES AND THE ENVIRONMENT;

3. TO ELIMINATE DUPLICATION OF GEOGRAPHIC INFORMATION MANAGEMENT ACTIVITIES;

4. TO INCREASE THE AMOUNT OF INFORMATION AVAILABLE TO MANAGE OUR RESOURCES;

5. TO ENHANCE THE JOB CREATION OPPORTUNITIES RELATED TO GEOGRAPHIC INFORMATION SERVICES; AND

6. TO TRANSFER TO THE PRIVATE SECTOR AS MANY GEOGRAPHIC INFORMATION ACTIVITIES (AND JOBS) AS POSSIBLE.

#4

N.B. GEOGRAPHIC INFORMATION CORPORATION

Major Responsibilities

- County Registry Offices
- Property Assessment
- Base Mapping
- Coastal Zone Mapping
- Remote Sensing
- Coordinate Survey Control
- Property Mapping
- Parcel Indexing
- Geo-information Standards
- Industry Development
- Toponymy
- Inter-agency Liaison

#5

NB GIC Legislation

Air Space Act

Assessment Act

Assignment of Book Debts Act

Bills of Sale Act

Business Improvement Areas Act

Conditional Sales Act

Condominium Property Act

Corporation Securities Registration Act

Land Titles Act

Real Property Transfer Tax Act

Registry Act

Residential Property Tax Relief Act

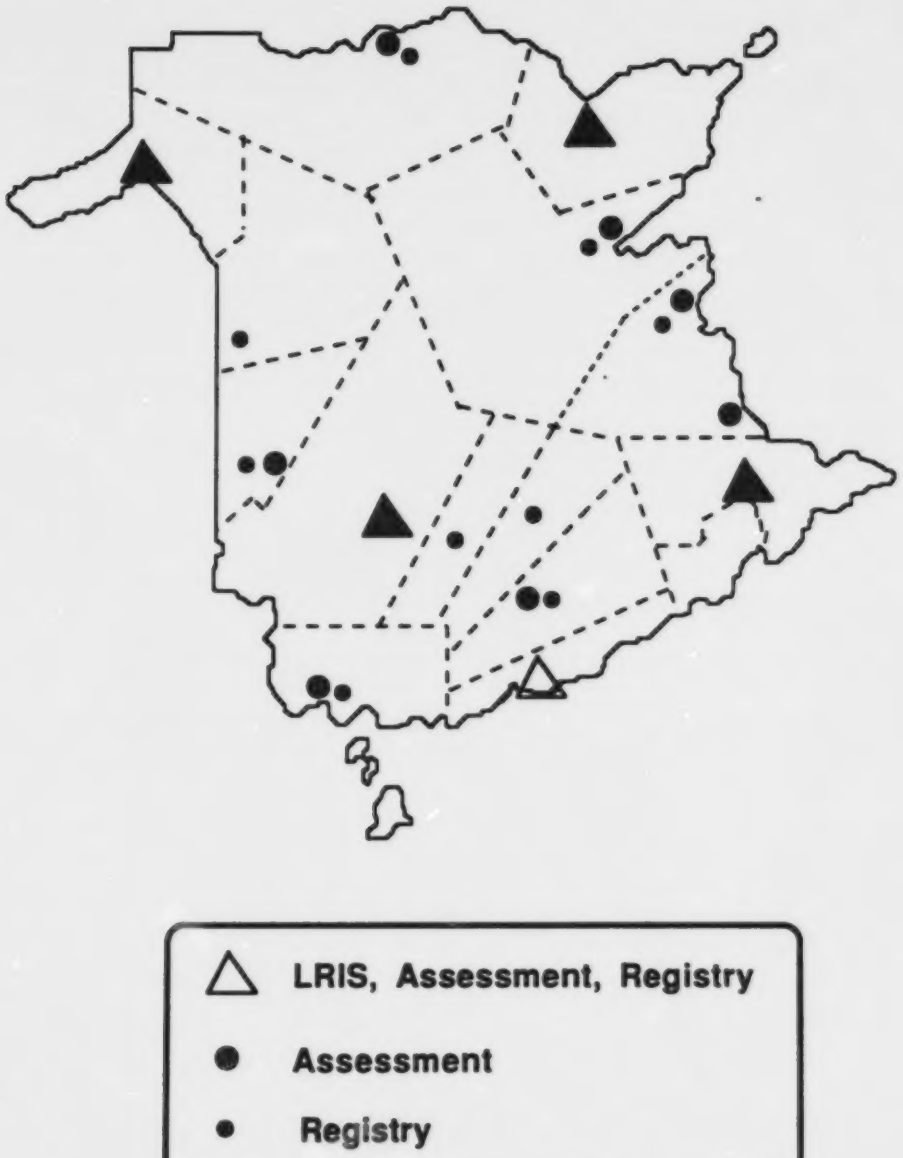
Standard Forms of Conveyances Act

Surveys Act

Territorial Divisions Act

#6

Location of GIC Offices



△ LRIS, Assessment, Registry

● Assessment

• Registry

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 17, 1990

GIMAC
GEOGRAPHIC INFORMATION MANAGEMENT ADVISORY COMMITTEE

by

Mary Ogilvie
Manager, GIMAC Secretariat

I want to talk to you about the Standards Committee because I think it will be an advantage to you, and help fill up the morning a little better.

GIMAC stands for the Geographic Information Management Advisory Committee. It replaces the old surveys and mapping committee which had been in place through much of the 1980's. When a lot of departmental interest in GIS and when the New Brunswick Geographic Information Corporation was formed, it was decided to review the terms of reference for the surveys and mapping committee and its sub committees to see if it still met the needs of the Province of New Brunswick, and as a result of the review of the surveys and mapping committees terms of reference it was decided to form a committee called the Geographic Information Management Advisory Committee who also formed four sub committees. The committee meets usually every month, normally on the second Thursday of the month. The chair the committee is elected by the members. Out of the surveys and mapping committee it was a permanent chair. This is one is elected by the members and the current chairman is Gerry Henry, from Board of Management who spoke yesterday morning.

The NBPIC provides secretariat services to the committee, does the agenda work and the minute work and writes up reports that are needed, follow through studies that are recommended, and provides the liaison with NBGIC. The terms of reference for GIMAC are then made available to those who want them, and if you're interested I can easily get you copies, but in essence the responsibilities of GIMAC are these: To advise government, its not to advise the NBGIC particularly, although that's considered part of government, but any recommendations coming out of the GIMAC deliberations can be directed to wherever in government it seems is most appropriate.

One of the very important functions, is to provide a forum for dialogue. Members on the committee sometimes are well versed in GIS matters or mapping matters or other matters and sometimes they are not. It often functions as a learning mechanism for many of the people around the table, and an opportunity for them to share experiences or frustrations with some of the work they have been doing. It also provides the NBGIC with departmental perspective-departmental perspectives of such things as the base mapping program, the priorities that the mapping should be done, what research and development projects are needed, their views on control surveys and other issues. It used to be that LRIS which was one of the components that was brought into the NBGIC had a board of directors of mainly civil servants, and the old surveys and mapping committee one of its main functions was to provide departmental direction to the Board of Directors. This kind of arrangement is no longer the same under the NBGIC and its doubly important that GIMAC provides the departmental perspectives to the GIC through this GIMAC committee. GIMAC also provides a mechanism of sharing data and experience and as often as the agenda permits if there is time on the agenda we will review some of the projects underway either at the University or in some of the departments.

The membership of the GIMAC committee is civil servants, usually at the director level and the departments that are represented around the table are these: Department of Agriculture, LRIS or mapping, Department of Environment, Department of Transportation, all the chairs of the sub committees, and there are four sub committees and the chairs of those sub committees are invited to the GIMAC meeting, Board of Management, Tourism, Recreation & Heritage, Fisheries and Aquaculture, Commerce and Technology. Municipal Affairs is also on there as is NB Power. As I mentioned the current chairman is Gerry Henry, Board of Management. His term is normally twelve months which would come up in October, so presumably in October we may have a new one.

There are four sub committees in GIMAC, one deals with mapping, one deals with surveys, one with remote sensing and one with GIS. As part of the review with GIMAC the terms of reference for the sub committees is also reviewed and the membership on the sub committees was also reviewed as a result the new revamped sub committees are just now getting into place because it took a while to get the membership straightened out.

The current chairman of those current sub committees are likely to be changed in the next several months, so there is not a lot of point in going through who they are now. One of the problems that we had with the sub committees, the GIS sub committee and the mapping sub committee, there is some discussion that their mandates overlapped and some effort is being put in at the moment in defining the line between the mandates of those two committees. These sub committees, some of them meet monthly, some of them meet less frequently than that. If you are on the sub committee that you get non governmental participation-remote sensing committee in particular has a lot of private sector and university participation. There is also private sector participation on the surveys sub committee. There is municipal participation on the mapping sub committee. The GIS committee is just getting set up now and they will consider the appropriateness of non governmental participation on that sub committee at future meetings.

There have been several projects that have been undertaken at GIMAC. The mapping sub committee in the area of mapping, there have been quite a few. I'll take them in order from across the screen. There is a coastal zone standard. There is a requirement from several different government departments for mapping in the coastal zone, that little strip that just borders on the land and goes into the ocean just a bit. Department of Natural Resources, Department of Fisheries and Aquaculture, there are seven departments that have an interest and their interests are completely different. Natural Resources needed just a base for looking leases and such, and Fisheries and Aquaculture is interested in a lot of different kinds of information that helps monitor and predict which sites would be good for aquaculture. It is difficult to come up with a set of specifications that suited everyone, so there was a project to develop those.

There is currently underway, a property conversion review, some of the hard copy property maps that are available throughout the whole province, some of those are being digitized, and there is a review of the digitization process and the maintenance process and where we should go from here. Specifications for updating. We have had since 1983 digital data being produced for the base layer for all of New Brunswick is about 65% complete. We've voted no resources to updating of this data. There was a review done by a private consultant on what was the best way to do the updating. Base map maintenance was the project I

just spoke about. Out of the base map maintenance project was recommendation that we develop some specifications for updating so that we can prepare to proceed to find the technology that's best. That's on the way at the moment, the specifications project has gotten underway.

About a year ago there was a review of base map priorities. As you are probably aware most of the work on the mapping is done out of what used to be LRIS in Summerside, and to some extent in Amherst. There was a review of the proportion of dollars that was spent on topographic base versus property conversion versus special purpose base, and the geographic priority within the province of how these programs were approached, and indexed the digital space data. This was a project coming out of the base map maintenance study. One of the recommendations was that we should have a digital index to the different digital files that are around, and there is a project underway to develop the best approach to getting this digital base data in place, finding the software and building the data.

Under the survey sub committee there were a couple of projects as well. There's a survey review task force to review the mechanisms in place to promote the use of the coordinate surveys. As a result of that review there is some discussion now about a survey pilot, although there has been no action on it yet. There's a committee being established to define it to see whether or not it make sense to proceed how much it will cost.

The other big problem that GIMAC looked after was the LANDNET II project. That was done by a private consultant. I don't think it was mentioned particularly yesterday, but it is a project to promote the linking of geographic databases and the best approach and the best kind of technology to use in linking those databases.

All the results of these studies are available, it is just a matter of contacting me if you want any of them.

The major projects that have been completed within the last couple of years are the standards study, we had a framework for developing standards for the province, the LANDNET II proposal which I now mentioned, the basenet maintenance studies and adjustments to the base mapping program. Of those, the first three were done by private consultants, either by funded by NBGIC or LRIS or by Commerce & Technology in one instance.

Now I would like to talk about the standards committee. As a result of that standards review, one of the suggestions was that we set up an interdepartmental committee to develop standards for the province in the areas of land and water information. It was a strong recommendation because it was felt that standards should be developed by people rather than imposed on them. I happen to be a part of a federal committee on standards in that area, and they are using the Canadian General Standards Board's approach to develop the national standards and their approach is the concensus approach and we decided to adopt the same approach ourselves, which means that the departments are part of the process, they buy into the process as they go along if there is a problem we try to resolve the problem rather than vote on a standard, and it is felt in this way, although it may take longer to arrive at the standards, it will take a lot less time to implement it.

The emphasis for the standards committee is on communications for compliance rather than imposition of a standard. We had several task forces and one of them was on communications and this was one of the recommendations coming out of that committee.

The standards committee is not a sub committee of GIMAC. It reports directly to the NBGIC. When Sandy was talking to you earlier about the mandate of the NBGIC, standards was clearly one of their mandates. Many of the people on GIMAC are also on the standards committee. The chair of the committee is from the NBGIC, I chair that committee, and it meets about three times a year but the task forces meet quite a bit more frequently. There are five task forces that always go through the membership first.

There are about twenty at the moment around the table reviewing standards, we've invited two more and there will be probably a third. At the moment their is Department of Transportation, Champlain Institute, Supply & Services, Professional Engineers, Fisheries Department, Natural Resources & Energy, Land Surveyors, Professional Foresters, Board of Management, NBTel, Tourism, NBPower, Agriculture, the Real Estate Council, Department of Municipal Affairs, Department of Environment, the NBGIC and LRIS or map link. The three invitations that have gone out recently are to private sector organizations, rather than additional government departments.

There are five working groups of the standards committee and I'd like to say right now how much effort is put into those working groups. These are people who have other full time jobs and I'm very happy about how much work goes on and how much they have been able to accomplish in the time they have been working. The five active groups at the moment, there is one on communications which Gerry Henry headed, one on terminology which Tom Erdle headed, one on data documentation which Emilia Sousa is heading, one on spatial referencing and one on feature classifications. Those are two recent ones that were just set up and I'm not sure who the chairman of those working groups are.

The Secretariat support for those working groups is also provided by the NBGIC. Dave Holland in our organization is doing that at the moment. The first three, communications, terminology and data documentation has been in place for about a year, spatial referencing and feature classifications are both four months. The next meeting of the standards committee will be in June. At that point we hope to have several chapters of the standards document ready for the committee to review and hopefully approved. If that happens then the standards manual will be distributed to those who ask for it.

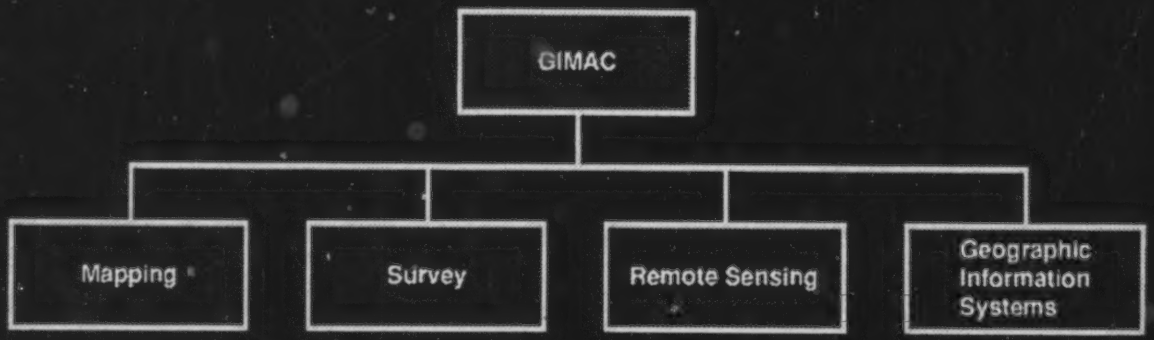
It's a living document, there are many other chapters to be written and even once the chapters are written, technology changes, time changes, software changes will affect some of the material in the manuals and so we will consider it as a living document. At the moment it will be hard copy but there are plans to have it available on diskette for different computer systems.

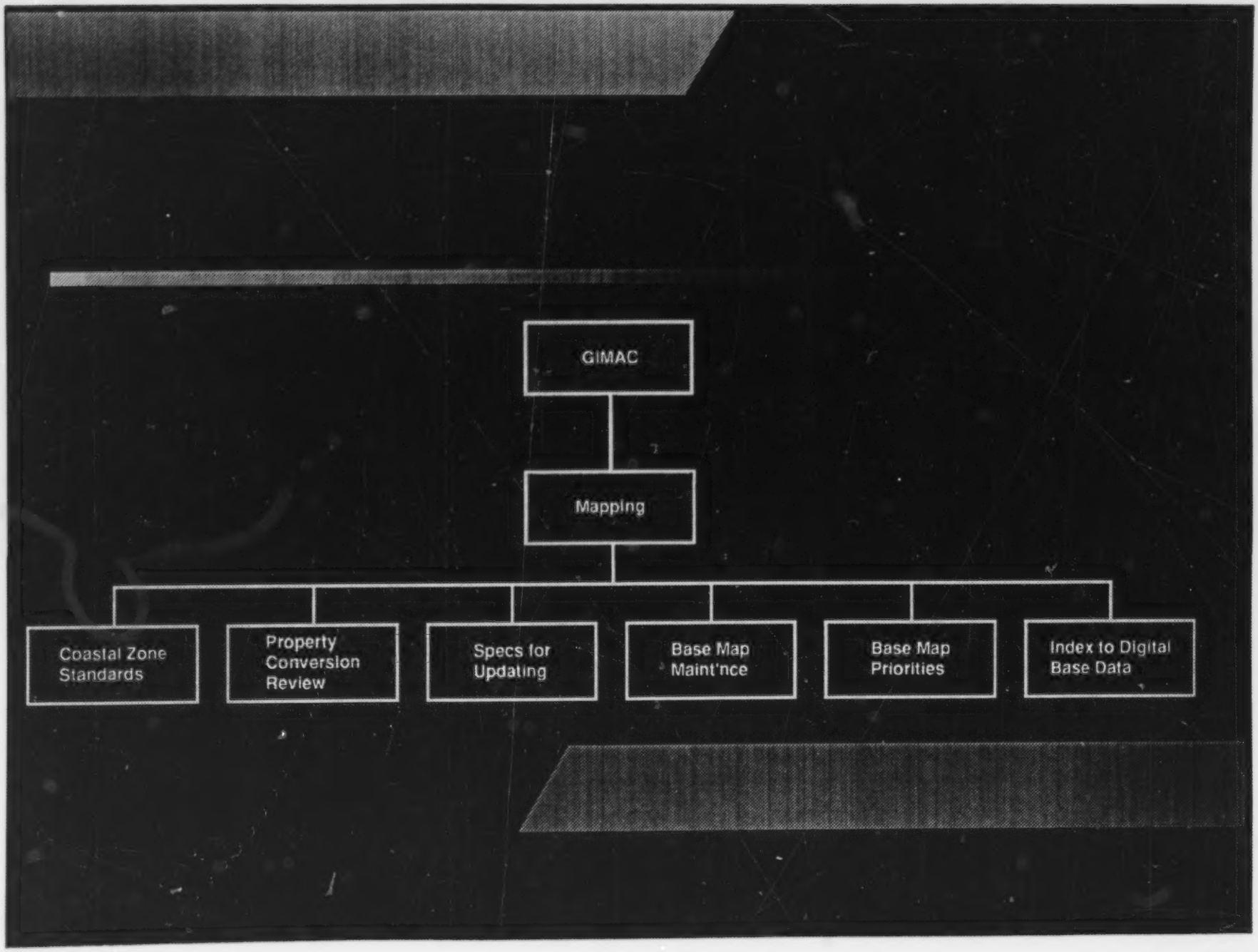
This is about the end of the presentation. If you need any information on either the GIMAC committee or the standards committee or if you want to receive an order form for the standards manual, you just contact the GIMAC secretary which is up at the NBGIC- interoffice mail will get it to her. If there are any questions I would be happy to answer them. Thank you.

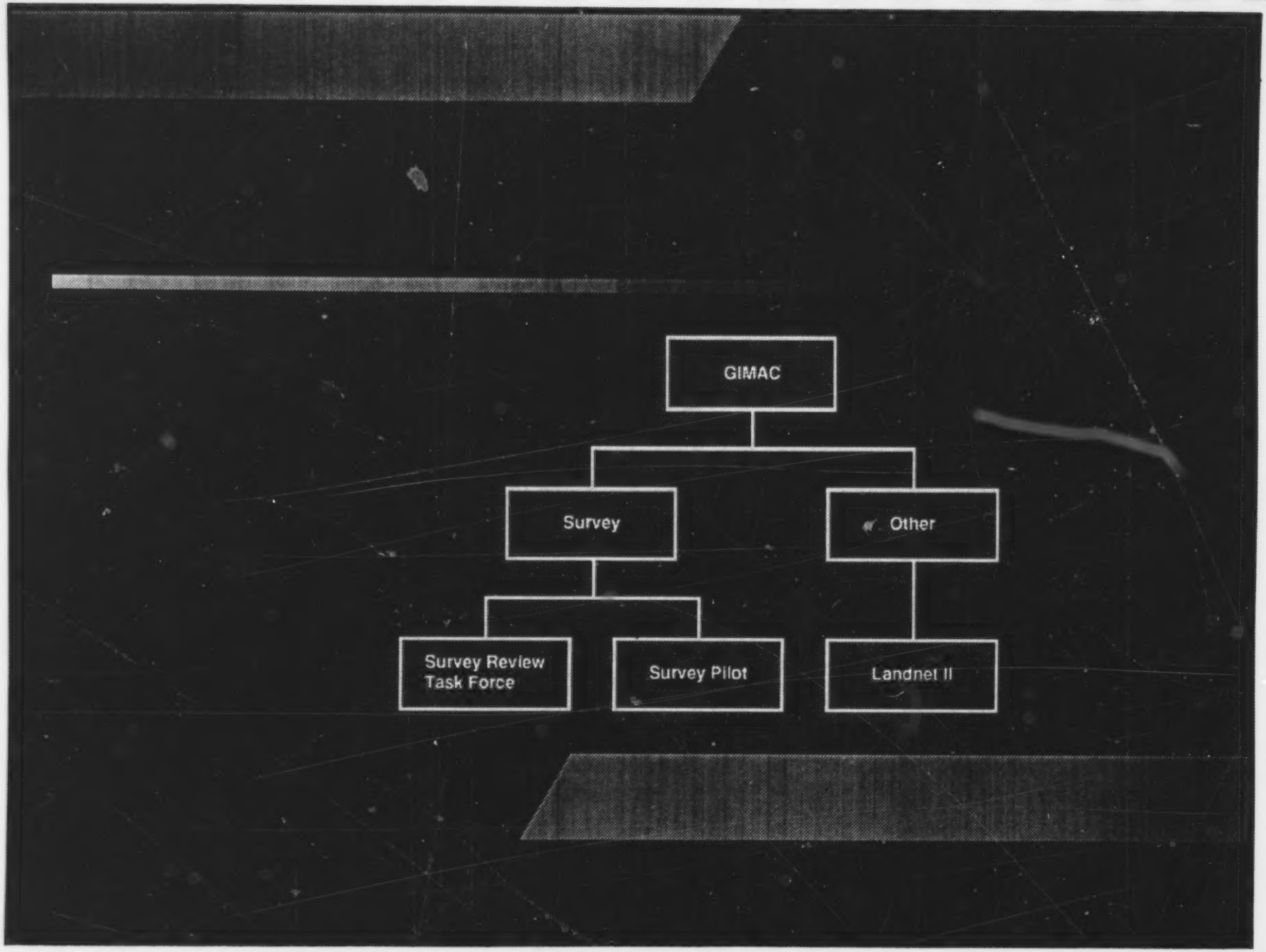
- Established following a review of the Surveys and Mapping Committee
- meets monthly, usually the second Thursday of a month
- Chair elected by members
- NBGIC provides secretariat services

- Advise Government
- Provide a forum for dialogue
- Provide GIC with departmental perspectives
- Provide mechanism for sharing data, experiences

- Civil servants, usually at the director level


GIMAC
Mapping
Survey
Remote Sensing
Geographic Information Systems

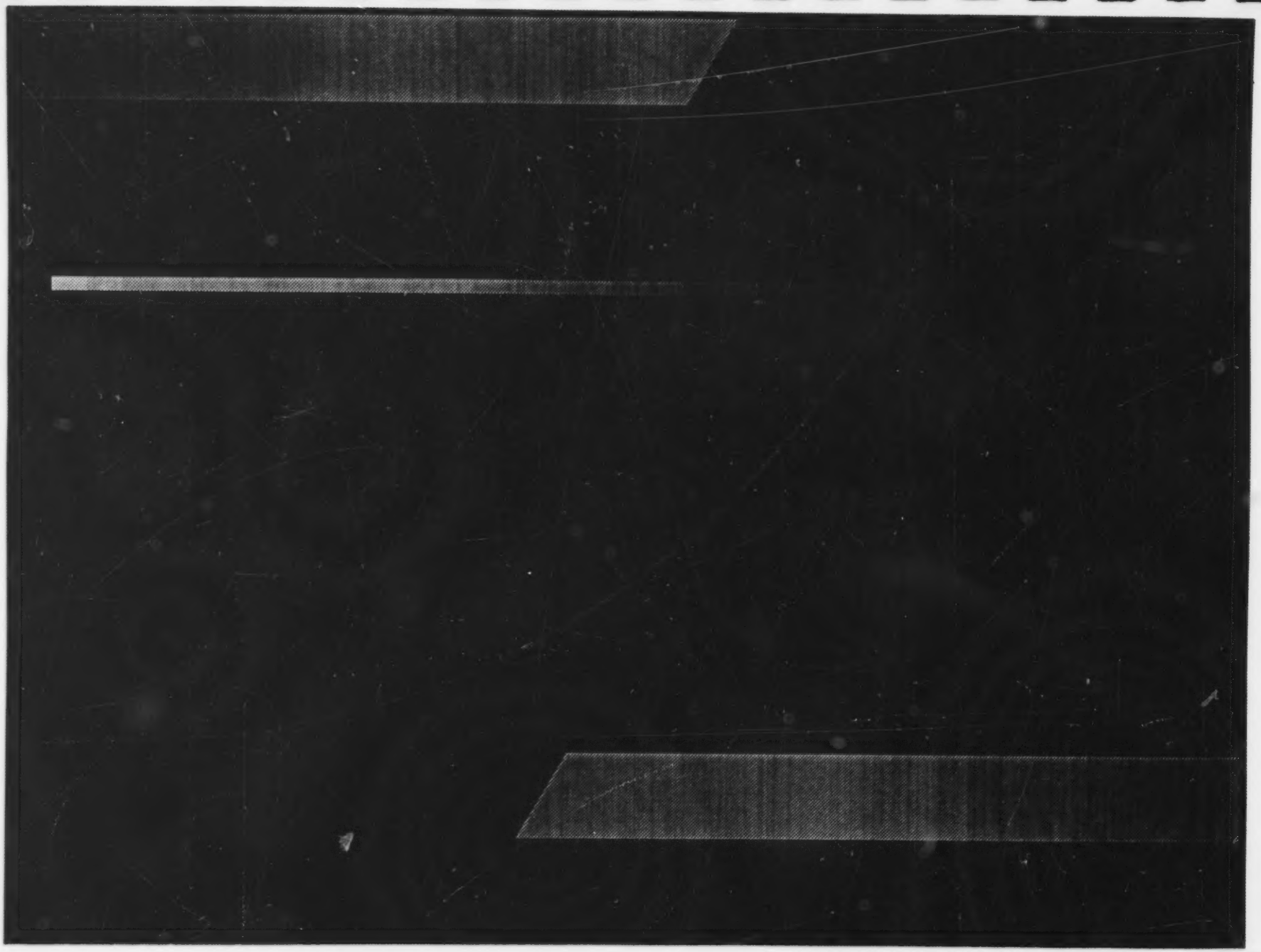

GIMAC
Mapping
Coastal Zone Standards
Property Conversion Review
Specs for Updating
Base Map Maint'nce
Base Map Priorities
Index to Digital Base Data

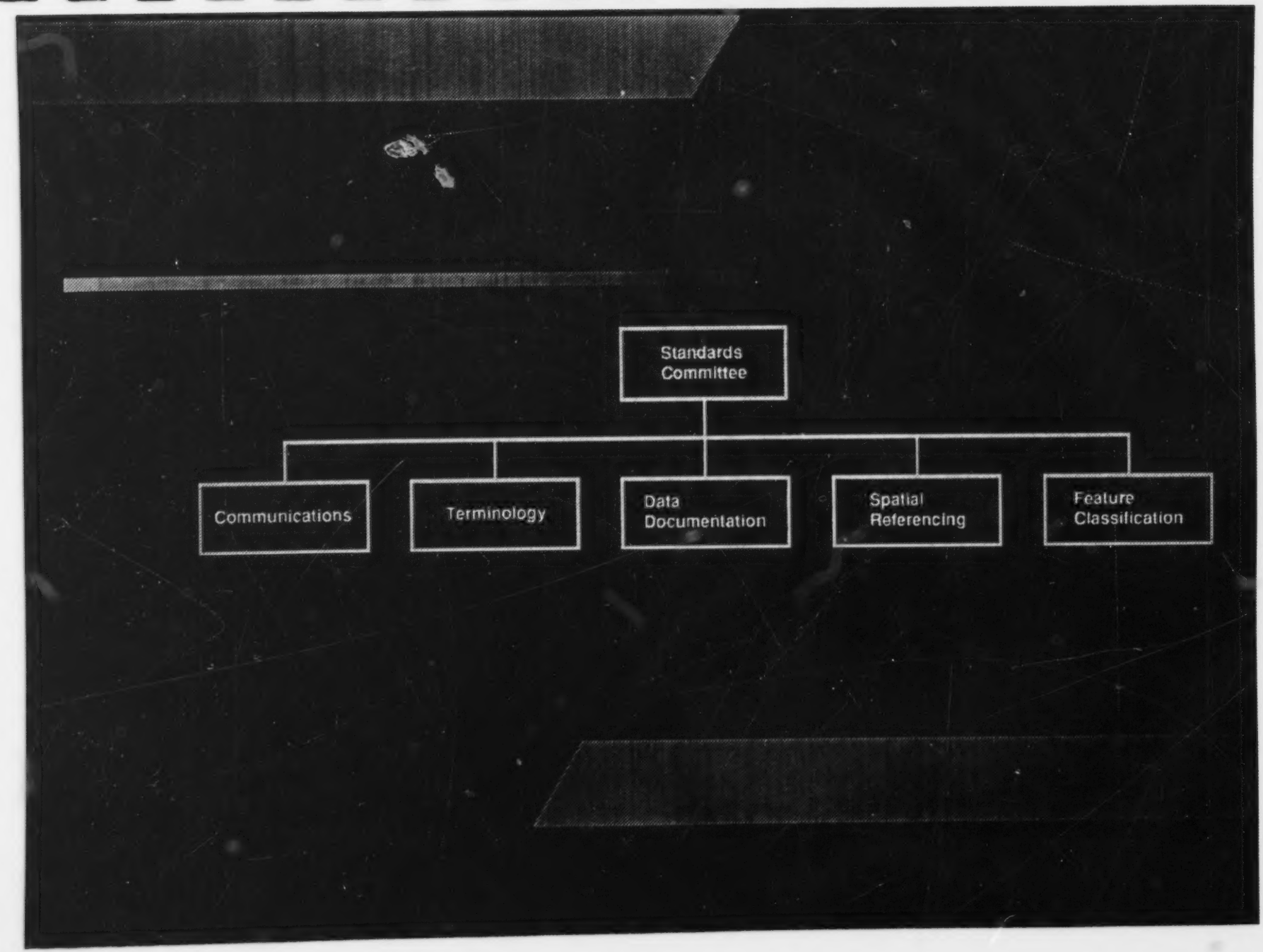

GIMAC
Survey
Other
Survey Review Task Force
Survey Pilot
Landnet II

- Standards Study
- Landnet II Proposal
- Base Map Maintenance Study
- Adjustments in Base Mapping Program

- set up after recommendations of standards report
- developing standards for land and water information in the province
- consensus approach to developing standards
- emphasis on communications for compliance

- not a subcommittee of GIMAC, but reports to NBGIC
- Chair is from NBGIC
- meets 3 times a year, task forces meet more frequently




Standards Committee
Communications
Terminology
Data Documentation
Spatial Referencing
Feature Classification

- First Chapters out in summer, 1990
- Work on other chapters underway
- To be a "Living Document"

- For information on GIMAC or Standards Committee
- To receive an order form for the standards manual
-
- CONTACT GIMAC secretariat, PO 6000, 985 College Hill Road, Fredericton

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 17, 1990

REVIEW OF GIS ACTIVITIES IN GOVERNMENT

by

James J. Chandra
Council & Projects Coordinator
Science & Technology Secretariat
Department of Commerce & Technology

INTRODUCTION

There is no singular definition of geomatics. We very often hear the expression "geomatics industry" but in reality, geomatics is nothing more than an informatics tool used by geologists, foresters, fisheries personnel and so on. Resource scientists have used this tool as far back as we remember, however, recent technology developments such as the personal computer have changed the way we process information. Geomatics has now become synonymous with computers and geographic information systems.

Since our economy is heavily reliant on its natural resources, it is a matter of survival for us to efficiently process and interpret information in order to better manage these resources. Our standard of living, has to a great extent, been dictated by our success in managing these resources. It is, no surprise therefore that New Brunswick has achieved some notariety in the field of geomatics. In the process, however, we have not done so well in manufacturing as some provinces in Canada.

INFORMATICS INDUSTRY

When we talk about Geomatics and Informatics, we are really referring to a service industry of which engineering services is one. The problem with service industries, is that they tend to occur around urban centres. The geomatics industry, therefore does not offer major job opportunities in the rural areas of New Brunswick. We see today a budding geomatics industry in Fredericton. We also see some presence in Moncton, Bathurst and Saint John. However, this industry does not hold much hope for entrepreneurs in rural areas such as Caraquet.

GOVERNMENT AND GEOMATICS

Government remains the single largest generator of information. It is also the single largest user. Because of this, line departments have spent considerable resources on acquiring, processing and managing information. Some departments such as Natural Resources and Energy have gone a long way in meeting their needs in information processing. In the area of geomatics, Timber Management Branch of DNR&E, by its achievements, exemplifies our capability to work in the highly technical area of geographic information systems.

However we, as a government, have failed to capitalize on some of the opportunities available to us in working with advanced informatics technologies. The loss of intellectual property is possibly one area which concerns me the most and should be a concern to all. Geomatics is only one of the many areas in which we have lost intellectual property. A recent survey of GIS activities in government (June, 1988) indicate that we have lost rights to intellectual property through publications and through working with contractors doing work on behalf of the province. Professional staff time was spent in developing "models" and "concepts" which have been taken advantage of by firms. In most of the cases, the "loss" occurred unintentionally because professionals were unaware of the harm done. Where intellectual know-how has been transferred to New Brunswick firms, the Province has gained, however, where the "know how" has been transferred to non New Brunswick and particularly non-Canadian firms, the effect could only be negative.

A caution to all of you working in the area of informatics (geomatics is an example) is that proper care should be exercised in dealing with information or software

companies, particularly where your ideas or work could result in improvements to products. Proper written agreements should be in place to allow for the work to be done but not at the expense of public good. All managers should be aware if Intellectual Property Rights and how employees could cause the loss of same through publications and by interacting with contractors. Technology is like water, it tends to flow everywhere and naturally. However, economic imperatives require that we develop the technology culture to accept the flow.

We are no doubt moving into the information age and personnel will become more and more involved in information know-how. We have not yet negotiated IP rights with the USA and we should begin under GATT. In the meantime, we should be very careful of companies inappropriately appropriating our know how. A rule of thumb we should use with software/information contractors is "Negotiate at the beginning and not at the end", hence the phrase "Negotiate or Litigate".

GIS ACTIVITIES IN GOVERNMENT

Perhaps the two most important GIS initiatives arising out of government recently are the creation of the N.B. Geographic Information Corporation and the Champlain Institute. Both these initiatives were launched with a considerable degree of hype and "industry" has been lead to believe that great things would happen as a result. However, the general feeling today is not as optimistic. Many, have come to realize that too much was promised and little achieved to date. In fact, many more believe that we have lost the edge we once had in geomatics and our only chance is to get our act together and at least try to catch up. Industry and government line departments are asking for leadership and are frustrated at the lack of progress.

In the interim, line departments are proceeding to meet their GIS needs as best they could with available departmental funds and also with assistance from their own Sub-Agreements and from the Industrial Innovation and Technology Development Subagreement. To date two line departments have completed GIS pilot projects; these are in the Right of Way Branch of DOT and the Geological Surveys Branch of DNR&E. You will be hearing more about these projects later in the conference. In addition, Commerce & Technology is presently exploring ways of assisting some other line departments such as the Department of Fisheries & Aquaculture, Department of Agriculture and the Department of Environment. However, financial assistance for pilot projects in these latter departments will depend on the availability of funds.

In addition to the above mentioned pilot projects, Commerce and Technology and ACOA have provided financial assistance to the Surveying Engineering Department at UNB for research and development activities in Remote Sensing. Several other public sector GIS/Remote Sensing proposals are being evaluated for financial assistance. Decisions on providing financial assistance to these will be made very shortly.

Commerce & Technology and ACOA have also provided financial assistance to private sector companies working in the are of geomatics. Some of these companies have received R & D investment assistance and assistance for training and for the purchase of infrastructure. A few other companies are presently working on proposals for assistance. These will be evaluated on receipt.

A POSSIBLE GIS STRATEGY FOR N.B

As I mentioned earlier, governments remain the major developers and users of GIS/RS related information. In fact, most of the GIS technology we know today has been developed to meet the needs of governments and their line departments. As an example, the Federal government has recently spent considerable funds to meet its GIS needs for mapping. Federal line departments such as Fisheries & Oceans, National Defence and Environment Canada are spending a lot of R & D dollars in the creation of data bases such as the LUMEX and LIMEX projects. As we well know from our local experience, such technology once developed in government is then adopted by private sector firms. A good example is Irving and Fraser following in the example of DNR & E in the adoption of a GIS system for application in the management of forests. As it stands now, only large companies and fairly large municipalities could afford to use a GIS as a tool. This is to a great extent due to the cost of hardware and software but more importantly to the cost of digital compilation of large volumes of map data.

Therefore, since we see that GIS/RS opportunities for the private sector depend on what happens in government, I propose that we develop a strategy to bring together industry and line departments of both the federal and provincial governments. This strategy must take into account the present informatics infrastructure in both levels of government and how both of these could be brought together to work with and through the industry.

Our Provincial Informatics Infrastructure (Figure 1) is based on statements described in our document on Land Information Policy. Its foundation is the private sector with the Geographic Information Corporation as Provincial Coordinator. All line departments support the L.I. Policy by adopting common standards and by participating and sharing in the development of data bases. It is also understood that where possible, private sector would deliver services and products to meet the needs of all the players.

On the Federal scene, there is also a "Federal Informatics Infrastructure" (Figure 2) which is not too dissimilar to that of this Province. However, federal coordination is the responsibility of the Inter-Agency Committee on Geomatics (IACG) rather than of a line department or a corporation. The goals and objectives of the federal IACG are not unlike those of the GIC.

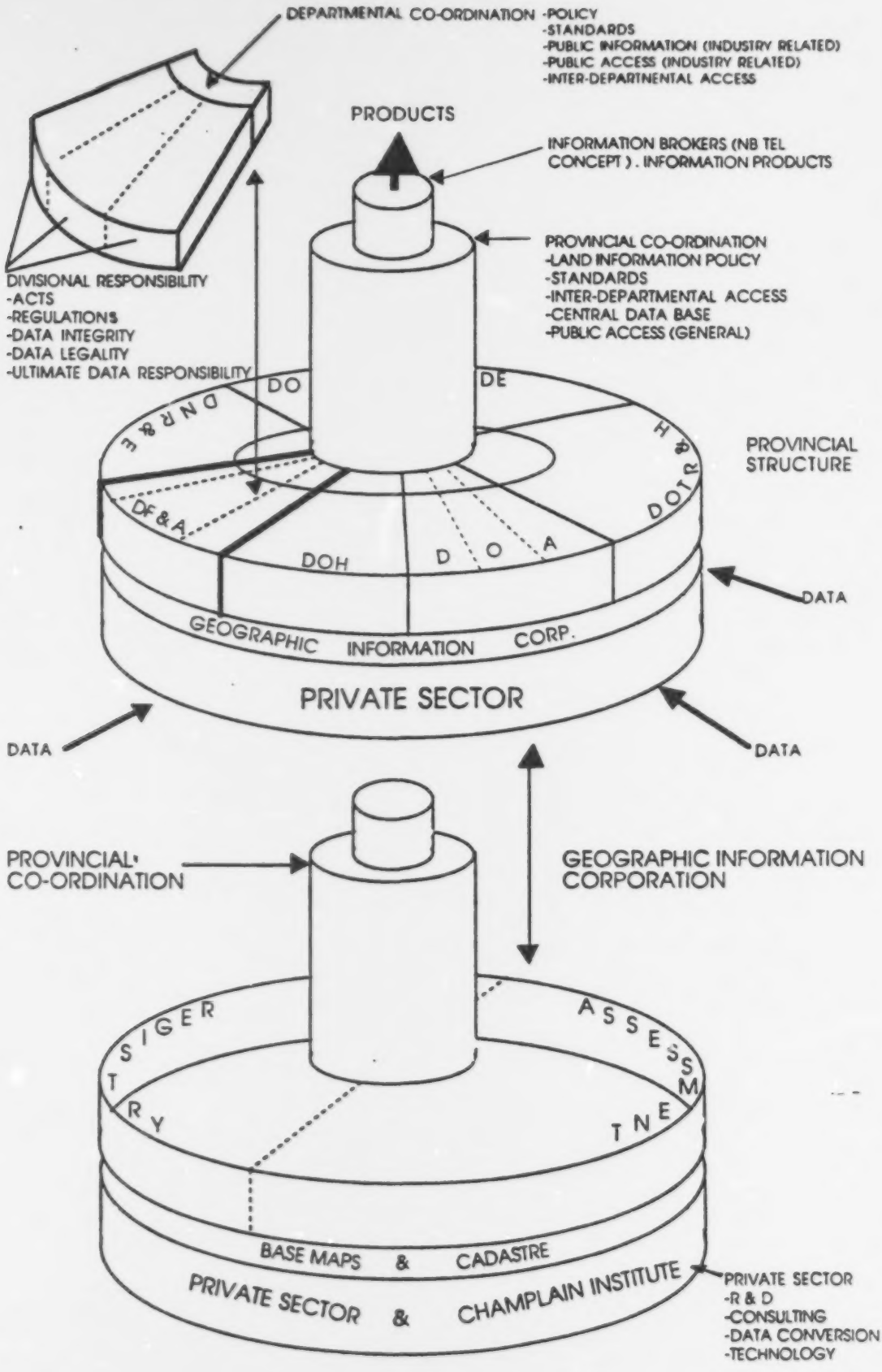
The bringing together of the GIC and the IACG, in a formal arrangement, would therefore permit both levels of government to work together in support of their own needs and at the same time sponsor and support the growth of a geomatics industry.

A Memorandum of Understanding (MOU) has now been signed between the GIC and the IACG recognizing their common objectives and their will to assist industry. This MOU now sets the stage for line departments of both levels of government to work together on meeting their common information needs. Taken as a whole, therefore,a National Informatics Infrastructure (Figure 3) could be realized. Both levels of government could begin to work locally and regionally to develop common databases and common information products. All of this could be undertaken with the help of industry and we could once again move ahead so that Canada could retake the lead in geomatics.

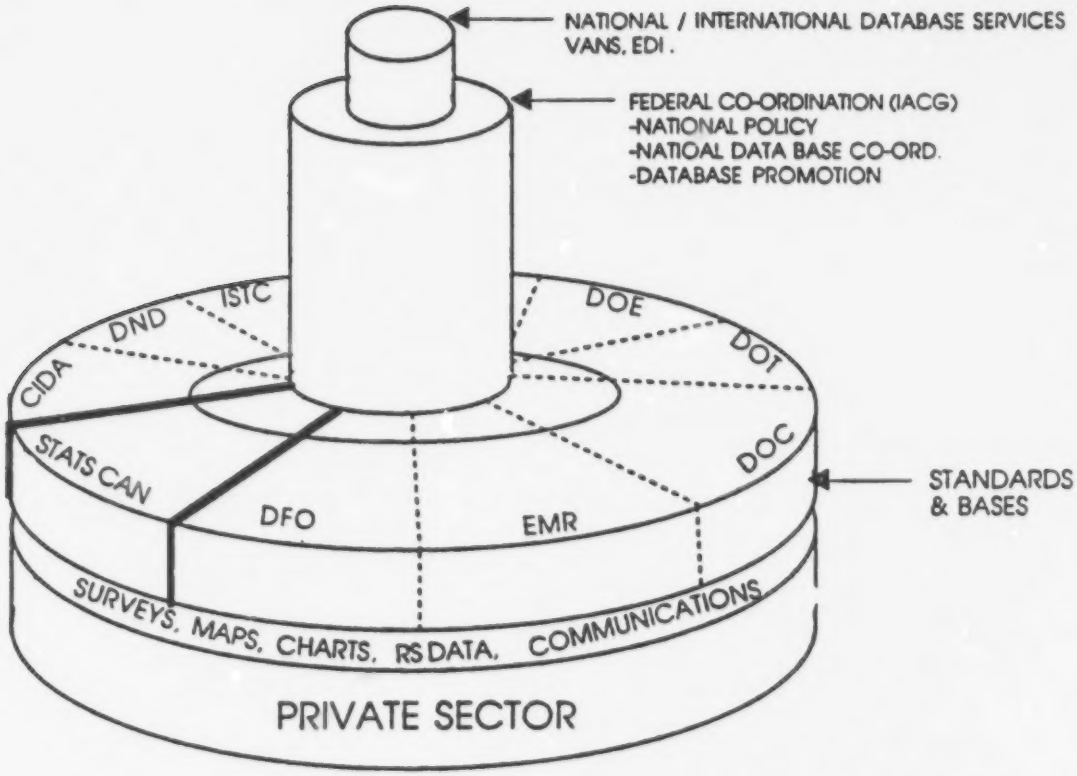
Before closing, we must recognize that industry cannot just jump into the business of geomatics without first understanding the technology and the risks of investing into such a business. Industry faces risks in a few particular areas where, without proper guidance and perhaps financial assistance, their jump into geomatics could be slow or not at all. As part of the solution to this problem, I would like to propose that government look at financially supporting a GIS/RS Technology Transfer Program (TTP), to meet the needs of industry. This TTP would allow industry the opportunity to train staff and to test the technology in-house before deciding on purchase. This TTP program would help to alleviate both the technical and financial risk facing industry in the adoption of GIS technology and for many, this could be the only way they could proceed.

CONCLUSION

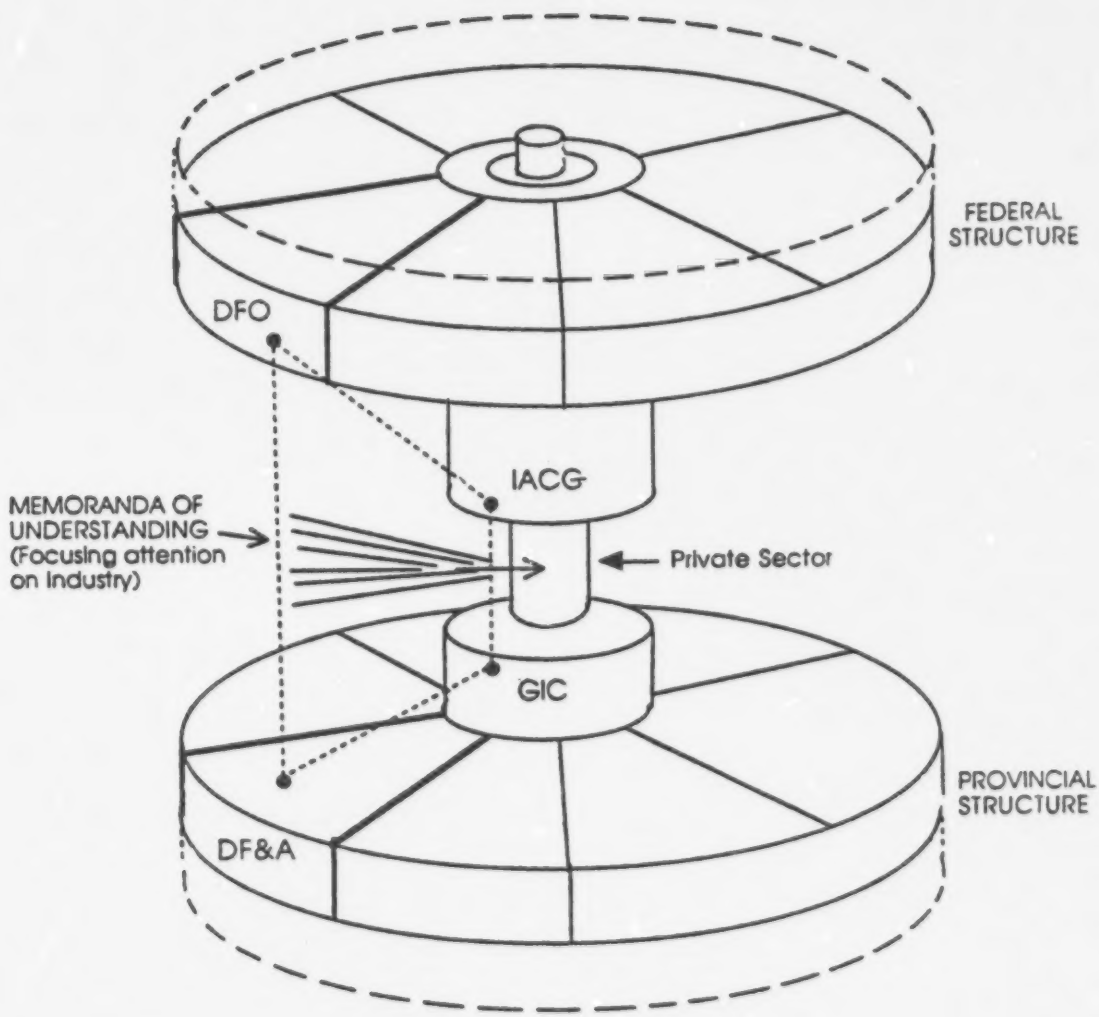
In closing, therefore, I would like to say that both our line departments and over fledgling industry are looking for guidance from government on where we should go. What we need is a champion or a hero to take this opportunity and insure that it does not go flying over the cliff.



PROVINCIAL INFORMATICS STRUCTURE



FEDERAL INFORMATICS STRUCTURE



NATIONAL INFORMATICS STRATEGY

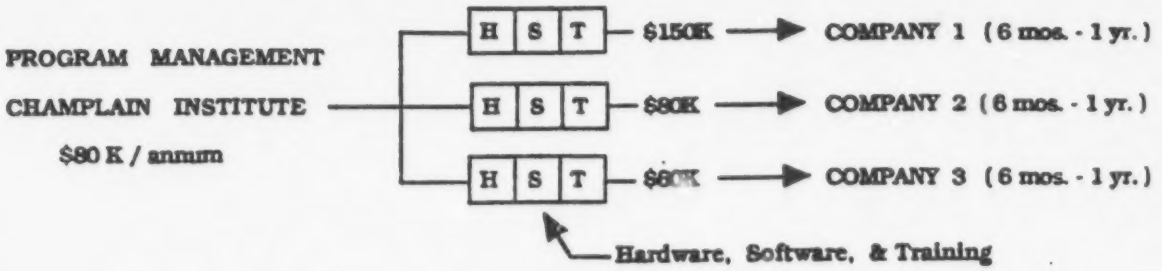
DRIVING MECHANISMS:

1. Industry Associations (GIAC) (Champlain Inst)
2. Federal Coordination (IACG)
3. Provincial Coordination (e.g. NB-GIC)

FUEL:

1. Technology Transfer Programs (Radarsat etc.)
2. Memorandum of Understandings
3. R&D Funding (3 identified sources)
4. Subagreements
5. Industry Support Programs (Federal equiv. CAD/CAM)

GIS INDUSTRY SUPPORT PROGRAM



COMPONENTS: (PACKAGE)	A	1.	Training provided free as part of package
		2.	Three software packages donated to the program
		3.	Hardware dependent on user needs
	B	1.	Company uses package at no charge for 6-12 month period
(COMPANY)		2.	Company purchases system after this period or return system to program manager
		3.	If company purchases system, money is used to put another package out to another company.
	C	1.	At end of loan period, Program Manager assists company with acquisition of system through ACOA and C&T industry assistance programs - e.g. loan guarantees interest buy downs grants
(MANAGEMENT)		2.	Program manager ensures packages are used effectively while in Company or seeks removal
		3.	P.M. evaluates the effectiveness of program
	D	1.	Program is run for a finite period of time (2-3 yrs) in order not to proliferate systems.
(WIND DOWN)		2.	At wind down time all systems passed on to Community Colleges to advance training on the labour supply side.

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 17, 1990

GIS TECHNOLOGY SERVICES

by

Robert C. Ellis, Executive Director
Data Centre Services
Department of Supply & Services

GIS TECHNOLOGY

D.S. & S. DCS SERVICES

OVERVIEW

WHY...we're into GIS technology
WHEN...we got into it
HOW...our entry approach
our service approach
WHAT...we've done since

CURRENT STATUS

PROJECT CONSULTING
DATA DESIGN & LINKAGE
TECHNICAL CONSULTING

FUTURE

TRAINING
PRODUCTS DEMO CENTRE
PROJECTS CONSULTING
TECHNICAL CONSULTING
DATA DESIGN & LINKAGE

GIS TECHNOLOGY

D.S. & S. DCS SERVICES

OVERVIEW

WHY...we're into GIS Technology

Shortly after establishing our GIS section within Technical Services we had an opportunity to make a public presentation on our

ROLE
GOALS
FACILITY

and

APPROACH

Our role and mandate strongly suggest that as the central, or "corporate" provider of computer systems technology, our role is

"...to facilitate, support, and provide the tools and services necessary for the government to meet the goals and objectives of its administration programs."

We fulfill that role now through the provision of computing facilities; data networks and administration; applications software analysis, design and programming systems consulting; product evaluations and technology training services.

Geo-based Information systems are a specialized form of computer technology which not only require relevant surveying engineering skills and experience, but also require the skills and experience of project oriented information systems personnel.

GIS TECHNOLOGY

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OVERVIEW

WHEN...we got into it

We first assigned resources to the GIS field in November/88 as a small section of our TECHNICAL SERVICES Branch. We re-assigned an experienced, trained resource of our own; Derek Davidson, and acquire additional resources under contract with Fred Kolls.

HOW...our entry approach

Recognizing the growing interest in this type of computer application, we realized that the optimum manner of using such a small but highly skilled unit was to provide project oriented consulting services.

In particular, we focussed on providing services which supported the newly formulated LIS Policy and the GIC corporation which had just been formed.

GIS TECHNOLOGY

D.S. & S. DCS SERVICES

OVERVIEW

HOW...our service approach

Our approach to introducing and providing our technical services was to provide training to our own DSS staff via seminars, video material and selected printed material; and to collect and circulate relevant material to departmental IS Coordinators.

Our preference was to introduce Departmental personnel to the key issues, attributes and opportunities presented by GIS technology application in their program and to provide the "up-front" organizational support when/where pilot projects were identified.

Our intent was, and still is,
to assist the government community in gaining a
generalized knowledge of GIS (CARIS);

to assist in organizing projects which would use GIS technology: (data requirements, process objectives funding and equipment identification)
and

to bring the private sector suppliers into play when the client was "organized and equipped" as a knowledgeable and responsible customer; thus maximizing both the effectiveness and the efficiency of the process.

GIS TECHNOLOGY

D.S. & S. DCS SERVICES

OVERVIEW

WHAT...we've done...since Nov/88

1...We have added a section to our technical library of GIS specific materials. This section now contains 2800 citations relating to technical papers, conference proceedings, journals and textbooks.

We have "enhanced" the accessibility of this material by providing a micro-based bibliography system which permits the user to persue by journal, author, subject or keyword. This system has been issued to all departments, and is updated and reissued on a quarterly basis.

2...Our GIS section has acquired several video tapes which present an overview of the technology; the systems, application, organizational, project and implementation issues. These have been viewed by all resource departments, and in some cases have been followed up by briefings, seminars and general question and answer sessions to supplement these videos.

Shows the main menu of the system with extended search selected. (slide 1)

Shows the search screen input options I just described. (slide 2)

Shows the search keyed in on the subject of DTM's (Digital Terran Models). (slide 3)

Shows a response to the query. (slide 4)

Another response. (slide 5)

GIS TECHNOLOGY

D.S. & S. DCS SERVICES

OVERVIEW

WHAT...we've done...since Nov/88

3...The GIS section has provided technical consulting services to 7 departments and agencies throughout the 1989/90 fiscal year; ranging from assistance with report preparation, proposals for funding, project organization and analysis, and data design.

4...The section has been involved as a technical resource to the departmental Strategic Information Planning projects undertaken by the I.S.Group in DSS.

5...We have been involved in linking private sector suppliers who can assist in the GIS projects with some departments, where those projects are at the stage of requiring additional assistance.

6...Our Technical Services Branch is involved in a joint project with UNISYS to build a generic interface between CARIS and a DMS1100 data base. This could prove to be a very key cornerstone within our government for the TEXTUAL side of a thematic GIS database.

GIS TECHNOLOGY

D.S. & S. DCS SERVICES

OVERVIEW

WHAT...we've done...since Nov/88

7...Our GIS section has built a very workable, micro computer based, map index software package which depicts all base maps used in New Brunswick. Also indicated are particular map scales and map reference numbers with added capacity to store data elements which describe map themes that have been added to these base maps.

This slide shows all of New Brunswick and the area covered by the Federally available 1:250 000 (say 1 to 250 000) NTS sheets. NTS means National Topographic Series. (fig. 1)

Shows the 1:10 000 digital coverage (fig. 2)

The system permits the user to zoom in for more detailed views, like in this example of the Fredericton area where the Gazetteer function has also been invoked to locate Nasonworth. In addition, it also shows the coverage of the old 20 chain series, the first series of maps that covered all of New Brunswick and the predecessor to the LRIS mapping. (fig. 3)

Shows Grand Manans Deer Island and area with the external coverage of the CHS (Canadian Hydrographic Service) work sheets in the 1:10 000 to 1:25 000 scale range and a request to the database for further data on map sheet number 9349. (fig. 4)

This "electronic" map index has also been added to our GIS Technical library.

8...Our GIS section has assisted USL in developing useable GIS application demonstrations, one in transportation and another, in conjuction with the GIS, on the use of a GIS within an emergency 911 system keyed to road networks and parcels.

9...In February/89 we initiated discussions to present a proposal for the establishment of a specific GIS software - education and products demo facility. This proposal would have seen an extension of our technical training role as represented by the ACCESS CENTRE; reflecting our services in government employee training for systems products.

Initial conversations were held within our own Department, and with the Board of Management, Commerce & Technology, UNISYS and USL.

GIS TECHNOLOGY

D.S. & S. DCS SERVICES

WHAT...we've done...since Nov/88

8...con'td

In short, our proposal did not qualify for then current fiscal funding, or for the Federal/Provincial Sub-Agreement on technical innovation.

Briefly, our proposal advocated utilizing our existing services an facilities in the context of our ACCESS CENTRE which provides technology training to the community of government employees.

Our physical capacity to provide training has in fact doubled, with the addition of expanded ACCESS CENTRE facilities in Marysville Place.

Our proposition outlined the utilization of both hardware and CARIS software, including UNIX and SUN platforms.

Our preliminary analysis indicated that at a 5 yr. cost projection of $1.8 million, a centralized and coordinated approach could save as much as $3.1 million over an ad hoc, when and as needed approach.

GIS TECHNOLOGY

D.S. & S. DCS SERVICES

CURRENT STATUS

PROJECTS CONSULTING

DATA DESIGN & LINKAGE

TECHNICAL CONSULTING

Without belaboring these points, we are currently engaged with several line departments in each of these capacities.

FUTURE

TRAINING

During this past year, our GIS Section has been involved in identifying training plans and requirements for three GIS sites in departments. This experience, and our early analysis of potential suggests that such training could amount to 4100 staff-days over the next three year period.

Based upon this projection, it is our impression that a facility would be utilized on a dedicated basis for the first three years, and following that, could be utilized as a small systems processing centre for those with "intermittant" needs.

GIS TECHNOLOGY

D.S. & S. DCS SERVICES

FUTURE...con'td

Moreover this centralized facility could be utilized not as a central "database" facility, but as a site for the evaluation of new products and/or software releases which facilitate data loading.

Database creation is, at this time, one of the more time and cost intensive aspects of GIS system building. This facility would reduce both effort and data redundancy to a large degree.

PRODUCTS DEMO CENTRE

The facility which exists within the Marysville Place complex is equipped and suited to both seminars and demonstrations as space has been designed for that very purpose related to other computing hardware and software products supported by the IS Group.

PROJECTS CONSULTING
TECHNICAL CONSULTING
DATA DESIGN & LINKAGE

These services are expected to continue as outlined previously, in response to the levels of service and support required by our government line departments as I.S. clients.

Storm Center Biblio-File System
Version 2.21

1) Pick a Database
2) Subject Entry/ Edit/ Delete
3) Citation Entry/ Edit/ Delete
4) Extended Search
5) Author Entry/ Edit/ Delete
6) Journal Entry/ Edit/ Delete
7) Keyword Entry/ Edit/ Delete
8) Make a New Database
9) Quit, Return to DOS

Use arrow keys or enter number or first letter of selection

<Esc> to abort

Subject: Sentinel Article:

Author 1: _____ Author 2: _____

Journal: _____

Keys:

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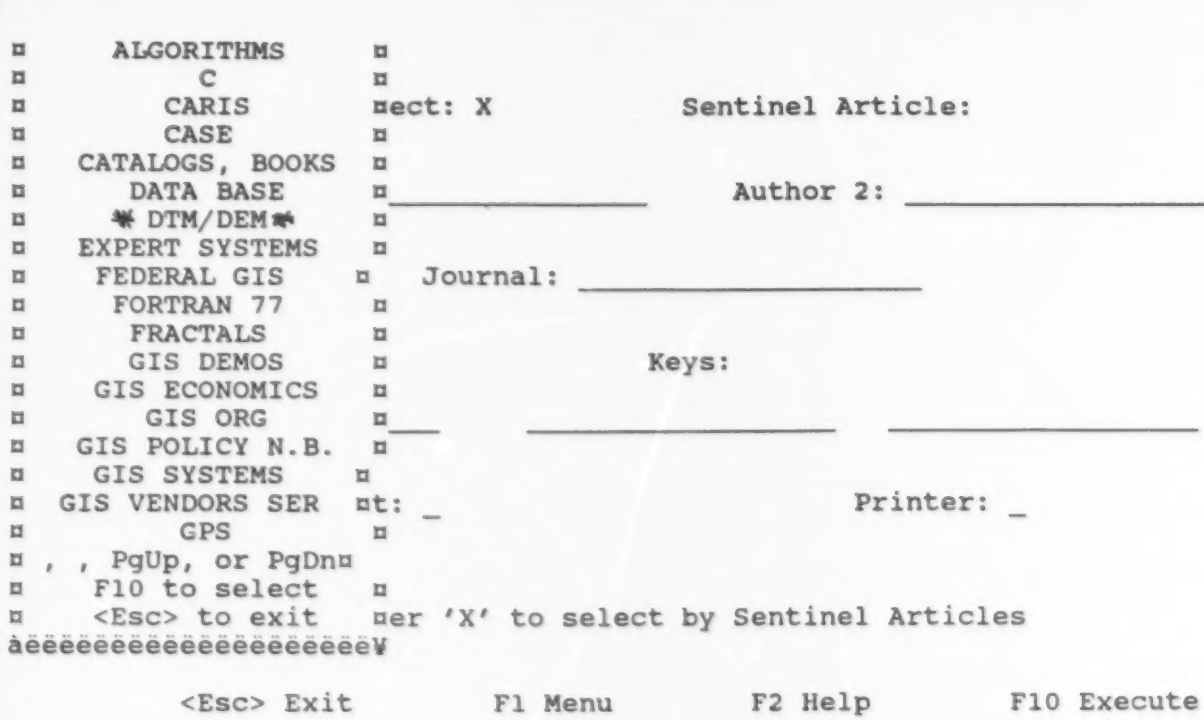
Sort: _ Printer: _

Enter 'X' to select by Subject

<Esc> Exit F1 Menu F2 Help F10 Execute

Slide 2


ALGORITHMS
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CARIS
CASE
CATALOGS, BOOKS
DATA BASE
* DTM/DEM *
EXPERT SYSTEMS
FEDERAL GIS
FORTRAN 77
FRACTALS
GIS DEMOS
GIS ECONOMICS
GIS ORG
GIS POLICY N.B.
GIS SYSTEMS
GIS VENDORS SER
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F1 Menu
F2 Help
F10 Execute

DTM/DEM

Title:
DIGITAL REPRESENTATIONS OF TOPOGRAPHIC SURFACES

First Author: CARTER J R _____ Sentinel Article _

Second Author: _____ Notes: Yes

Journal: PHOTOGRAMMETRIC ENGINEERING REMOTE SENSI

Volume: 54 _____ Beginning Pg.: 1577_ Ending Pg.:1580 Year 1988

Keys:

DTM_____ _____ _____
_____ _____ _____

<Esc> Exit F5 Show Comment PgUp Prev. Cit. PgDn Next Cit.

Title:
DTM ANALYSIS PROJECT

First Author: SMITH E H _____ Sentinel Article _

Second Author: _____ Notes: Yes

Journal: NOT AVAILABLE

Volume: 0_____ Beginning Pg.: 1_ Ending Pg.:112 Year 1989

Keys:

DTM_____ _____ _____
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Slide 4

Title:
AUTOMATED DTM VALIDATION AND PROGRESSIVE SAMPLING ALGORITHM OF FINITE ELEMENT ARRAY RELAXATION

First Author: RAUHALA U A_____ Sentinel Article _

Second Author: DAVIS D_____ Notes: Yes

Journal: PHOTOGRAMMETRIC ENGINEERING REMOTE SENSI

Volume: 55_____ Beginning Pg.:449 Ending Pg.:465 Year 1989

Keys:

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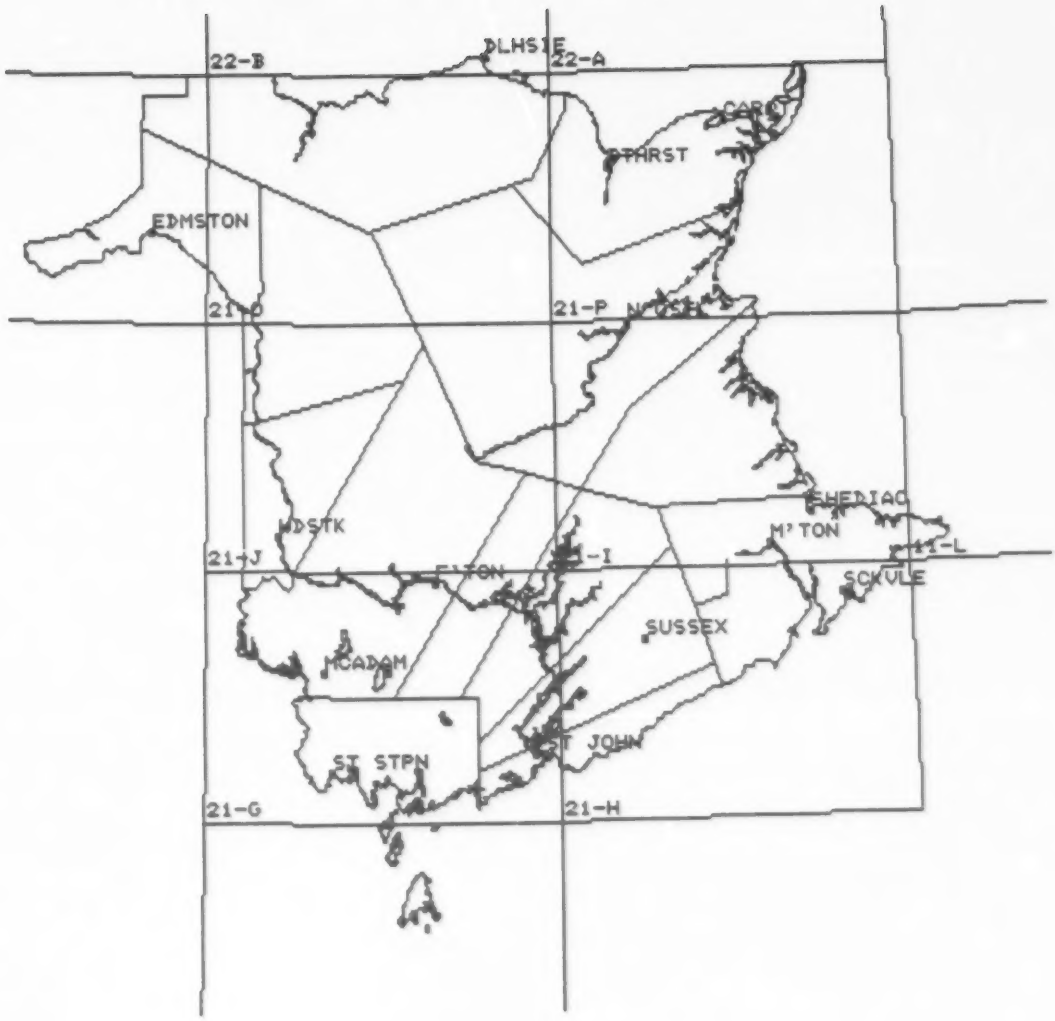
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Figure 1

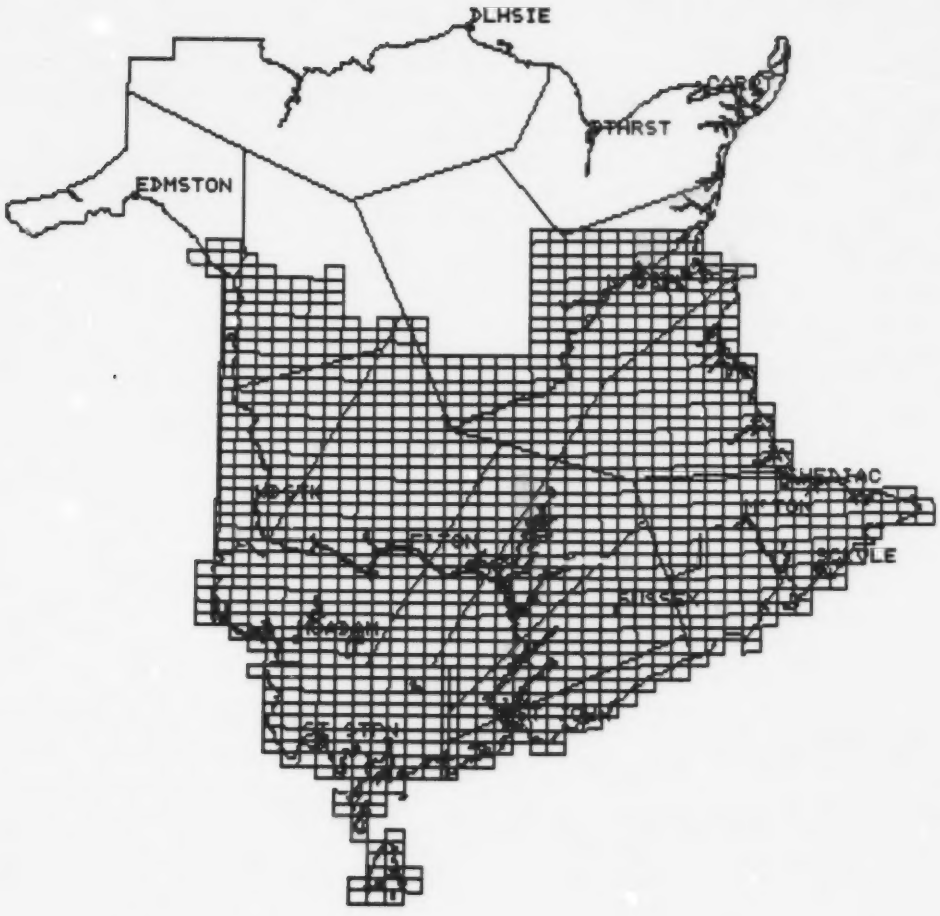

Figure 2

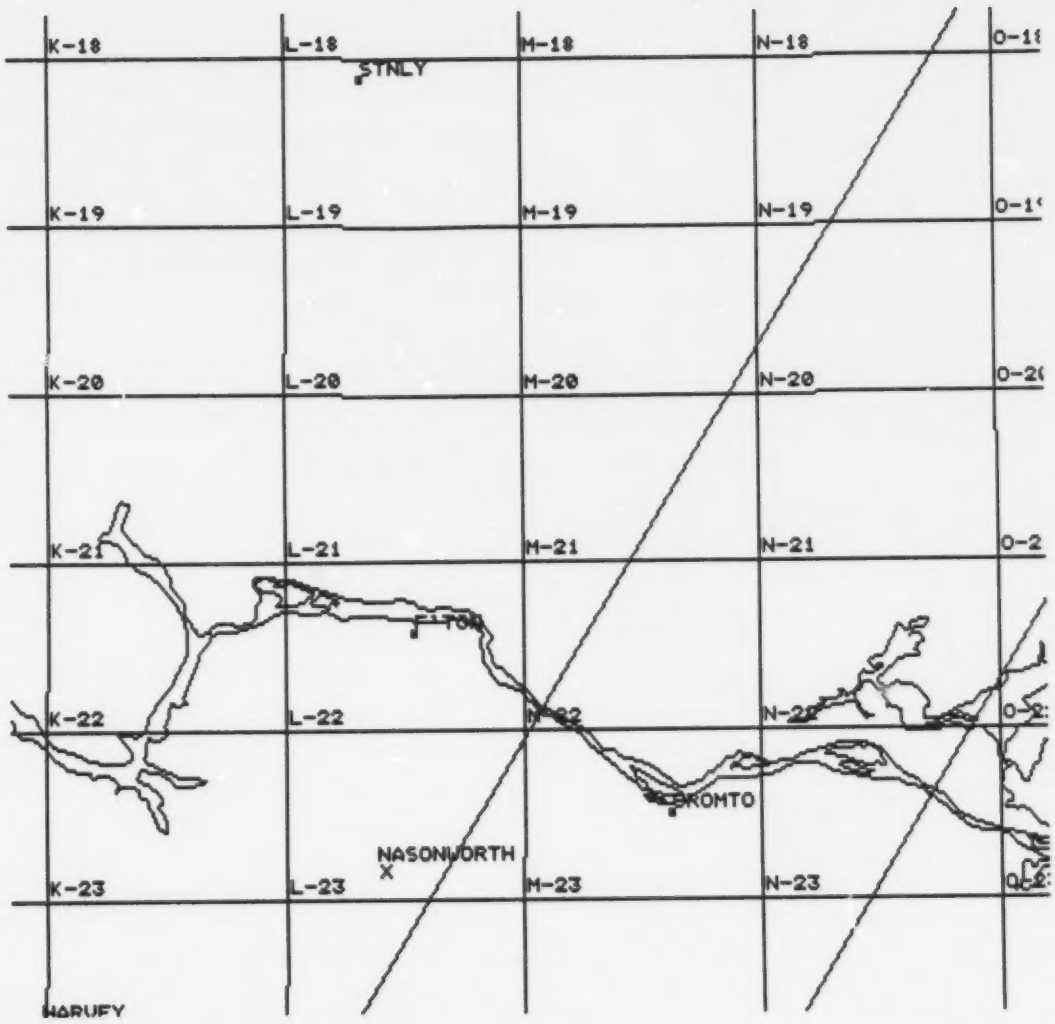
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Figure 3

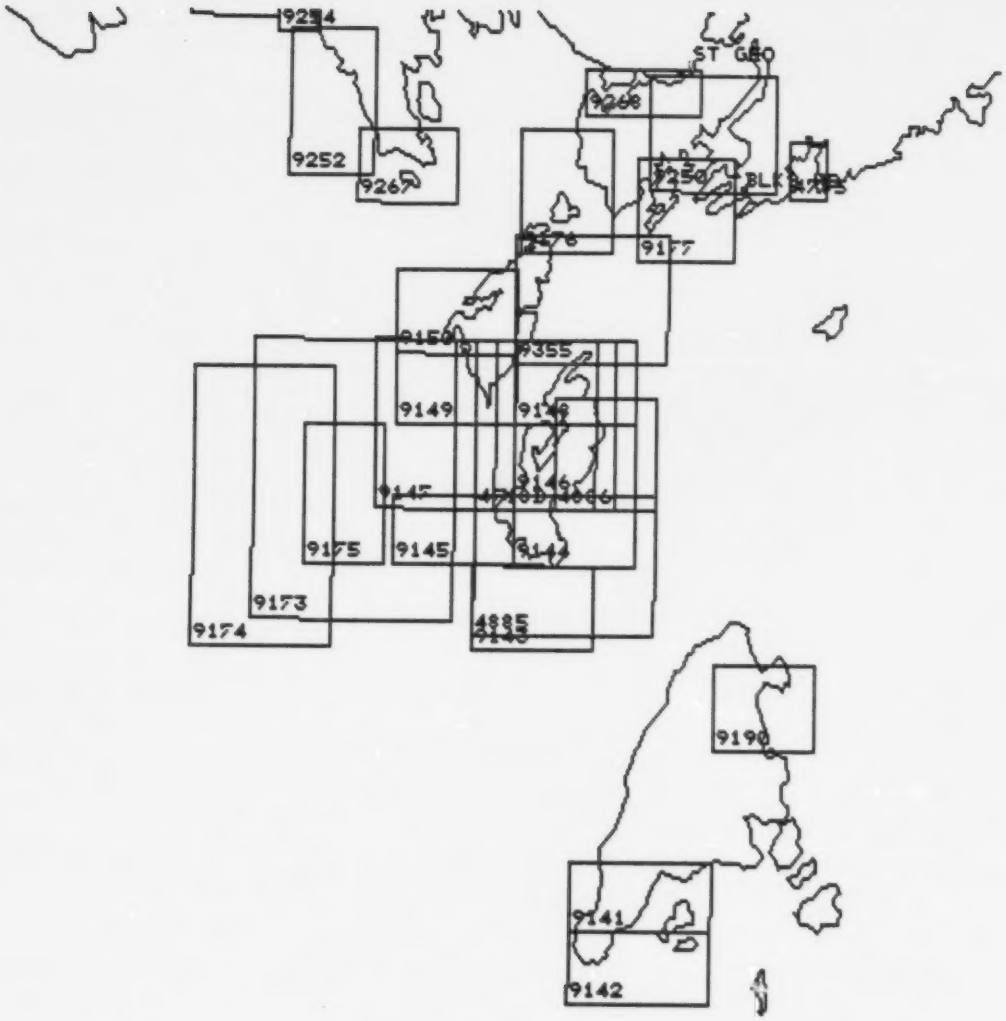
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Figure 4

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 17, 1990

A GIS USER'S VIEWPOINT

by

Dr. Michael Dillon
Department of Agriculture

THE AGRICULTURAL LAND INFORMATION SERVICE

LAND RESOURCES BRANCH

NEW BRUNSWICK DEPARTMENT OF AGRICULTURE

Prepared by Dr. Michael Dillon for the

N. B. Government Information Technology Conference

17 May 1990

INTRODUCTION

The goal of the New Brunswick Department of Agriculture is "the continual growth and development of a viable agricultural industry throughout the Province in such a way as to maximize its contribution to the total Provincial economy...". A major component of the efforts to meet this goal is the improvement of the management procedures being used by farmers to increase production from their land while maintaining a sustainable production system. To do this requires a considerable quantity of information about the natural environment which the farmer is managing. This means that information about the soil, water and climate must be available to the farmer. He or she must also understand the relationships among the many environmental factors.

Both the Federal and Provincial Departments of Agriculture have been providing this type of information for many years. Until recently this information came in fairly standard packages. In the case of soils the form was a map on a large sheet of paper with many colours and long complex symbols and accompanied by a written report. Without a degree in agriculture it was very difficult to extract from this complexity just what it all meant for the operation of an individual farm. Consequently these maps and reports frequently became little more than dust collectors. In the case of climatic information the data usually came in the form of large tables of numbers which required considerable mathematical analysis to be useful to a farmer. They frequently were used the same way as the soil surveys.

Computers are marvelous tools for pushing around numbers and for sorting vast amounts of data. Because their needs were for this type of activity climatologists were early users of computers in their work. The information the agro-climatologists (those climatologists specializing in the types of climatic data needed for agriculture) gradually made their information more directly useful to farmers. The farmer was still left, however, with a lot of interpretation to make it fit his or her own particular farm.

The advent of computerized cartography provided the soil surveyors with a tool to speed up their map production processes but did little to simplify the output. It was when the ability to draw maps automatically was married to the ability to sort data in wide varieties of ways to produce what we call today Geographic Information Systems that we began to see opportunities to greatly improve the presentation of soil and climate data. We now have the ability to select from the vast quantities of available data that which is relevant to individual farms. This makes the result much more useful to the individual farmer without the need for him or her to spent large amounts of time to learn how to use it.

THE NBDA GIS

Four years ago the Land Resources Section of the Plant Industry Branch, (now the Land Resources Branch) proposed that the Department acquire a Computer Aided Resource Information System (CARIS). As this required a fairly large expenditure, and at that time large expenditures for computers were not common in the Department, it took considerable time, persuation and negotiation before it was agreed that a system be acquired. Although we could have begun with a small micro based system we opted for a larger system with the potential to eventually handle data for the entire province. The system was to be acquired in stages with only the elementary map drafting capability to be acquired the first year. The cost was to be split between the Federal and Provincial governments using both the Agriculture sub-agreement and regular budgets.

In March 1987 we took delivery of a MicroVAX II computer with a 156 Megabyte hard disk, a Calcomp digitizing table with a USL controller, one VT220 text terminal and one Tektronix 4207 graphics terminal. Software included the Primary Grqaphics package from CARIS and an imbedded or "run time" version of Ingres. We already had a Hewlett Packard 7585 8-pen plotter and a printer. This was a major step forward for us. We have since added another hard disk and a laser printer as well as two modem connections and three VT220 text terminals.

At that point in time our total computer knowledge was one micro-computer course our Cartographer had taken at UNB and what I had learned on a Timex Sinclair 4K micro and on an Apple by the "teach yourself method". Had I known then what we should have known I probably would never have become involved. We had a week of training provided by USL after which we were on our own. Without the very extensive support we received from the USL staff in that first year we would not likely have survived. We had to learn the VMS operating system, Ingres and CARIS all at the same time. Fortunately our Cartographer saw this as an opportunity for himself to upgrade his skills and put a lot of effort into learning. We also had help from one of our laboratory staff who had more computer training than we did.

We began producing maps of the soils on individual farms, using manual replacement of polygon labels. In the second year we acquired the secondary graphics package from USL which gave us full GIS capability. This speeded up the production of on-farm maps and allowed us to begin producing true GIS products. I will refer to these in more detail in a moment and you will be able to see examples in the display area.

During this second year we transferred the Farm Land Identification Program (FLIP) data base to INGRES from a very old CPM based PC and we developed a completely new information system for the Federal/Provincial Livestock Feed Initiative. This was done with the help of two temporary employees.

I will now outline briefly the display of maps and data. There are 29 maps altogether, grouped into six general types. These are:

1. Reconaissance soil and climate maps
2. Detailed base and climatic maps (1:10,000).
3. Cansis soil maps. (various scales)
4. Property maps.(scale 1:10,000 and larger).
5. On-farm soil survey and evaluation maps.
6. Statistical data for management.

1. Reconaissance soil and climate maps

The first uses of computers for soil mapping were to take data already available on paper and to digitize it. This type of procedure is illustrated in the small scale (1:200,000) map of the Perth Andover to Woodstock Climate Zones, and the Florenceville Soils map. The climate zones for that area were also mapped at the same scale (1:100,000) and the GIS capabilities were then used to combine these two. That is in addition to a simple overlay of the two maps such as was commonly done with transparent plastic the computer is used to appropriately combine the legends for each of the new polygons created. The result is the Florenceville Pedo/climatic Zones map.

2. Detailed Base and Climatic Maps - The Grand Falls Example

Another example of this type of overlay at a much larger scale is shown on the Grand Falls area map. The base map is produced digitally by LRIS/Maplinc in Summerside PEI and was plotted in the Department of Agriculture. Our climatologist has developed a model using the local weather station data accumulated over the years combined with the elevation data to divide the map into areas of heat units. This map shows 6 Zones from I with the most heat available to VI with the least. Farmers can use this type of map when deciding where to put tendre plants or crops for early harvest such as early table potatoes. It is hoped that more of this type of detailed climatic data will be made available in future including further refinements such as the effects of distances from water for coastal areas.

3. CANSIS Soil Maps - The Hildegarde Example

The Canadian National Soil Mapping effort is located in the Land Resource Research Center in Ottawa with branches across the country including the Fredericton Branch which is the partner in our Agricultural Land Information Service. They are producing digital soil maps using an Arc/Info system in Ottawa. We are in the process of transferring to Fredericton the maps that are available digitally and new ones as they are produced. The Hildegarde sheet (covering an area near Moncton) was converted to CARIS and the accompanying database loaded into INGRES. The powers of the GIS system were then used to select desired attributes to produce the slope map, and a labelled soil map as well as to overlay the soil data on an LRIS/Maplinc base map to assist in identifying location.

4. Property Maps - The Breau Creek Marsh Area

While the base map as used in the Grand Falls areas and the Hildegarde area give a general indication of location it is not until the legal property boundaries are shown on a map that a landowner can identify his property with certainty and accuracy. The New Brunswick Department of Agriculture has the responsibility of maintaining the dykes and drainage systems in the marshlands of the south-east. The properties in that area are often very small and sometimes difficult to identify exactly. This is why we had property maps made by LRIS/MAPLINC in Amherst for the marshes. The Breau Creek area is a sample of these property maps which are of great assistance to the drainage engineers working on the marshes. The original 1:10,000 scale maps have been "blown up" to 1:5,000 to match the scale of the engineering drawings of the marshland ditching for ease of use. They are overlayed on the standard base map and the properties owned by persons actively farming the land have been identified by name using the land ownership database which accompanies the property map. Property boundaries within land areas owned by the same owner have been removed to make a map showing the farms rather than the legal deeded properties.

5. On-farm Soil Survey and Evaluation

The most detailed level of Geographic Information being produced by the ALIS is the on-farm series. These maps and data bases are produced for individual farms on the request of the owner/operastors. About fifty farms have been mapped and the number is growing as staff time permits. The location of the property is digitized from LRIS/MAPLINC paper maps and the soil data and field boundary data is collected by Department staff in the field and recorded on aerial photographs. The lines are then digitized and the data entered into tables in the database. A series of 8 maps are produced showing individual attributes such as texture, drainage etc. and an interpretation of the potential of the soil for agricultural use.

We are in the process of developing methods of adding climate information to these maps. The Grand Falls Climatic Zones map mentioned earlier is an example of these efforts. More work is required to develop the procedures before we can begin adding climatic data as a routine product.

The other area where progress is being made is in providing farmers with ways of keeping records of the soil and crop actrivities carried out on each field. Funding from the Livestock Feed Initiative has been used to have a Consultant prepare a PC version of the existing record-keeping books. This product is now being tested and will soon be made available for farm use.

6. Statistical Data for Management

Using a query interface developed for us by a student from the College of Geographical Sciences we can query the INGRES database and produce aggregated data useful for program amnagement.

Databases

For those interested in the details of our databases there are some samples available.

Questions

I invite you to visit the display of output from the Agricultural Land Information Service. We well be pleased to try to answer any questions you may have when you visit the display.

Thank you for your attention.

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 17, 1990

A GIS USER'S VIEWPOINT

by

Rao Irrinki
Natural Resources

GEOGRAPHIC INFORMATION SYSTEM AND THE MANAGEMENT OF NEW BRUNSWICK MINERAL RESOURCES

R R IRRINKI

BACKGROUND:

Customization of digital base maps, geoscience data compilation, geoscience data integration, and sharing are the dominant factors in obtaining the Geoscience Information System.

One of the priorities of the Minerals and Energy Division, is to offer to the mining industry the best geoscientific information available on the mineral potential of New Brunswick. To this end, the Division manages a bank of geoscientific data acquired over 50 years by itself, the Federal Government, Academic institutions, exploration companies, and prospectors. This data bank comprises several thousands of documents totalling several hundred thousands of pages of text, several thousand maps, and a few thousand microfiche. Because of the great amount of data (paper and microfiche), manual treatment of this information is becoming more and more cumbersome, inefficient, and expensive. This is leading to an under-utilization of information that has been acquired at an estimated cost of billions of dollars. The Geological Surveys Branch contracted out the compilation of geoscience data for NTS 21 O/8 at a cost of $80 000, and published 120 maps.

The Minerals and Energy Division staff extensively use base maps at various scales ranging from 1:5000 to 1:500 000, but most commonly use 1:10 000, 1:20 000, and 1:50 000 scales. Traditionally, hard copies of the base maps at scales of 1" = 20 chains and 1" = 40 chains have been obtained from the New Brunswick Lands Branch, and 1:50 000 and 1:250 000 from EMR, Ottawa.

Recent policy changes dictate that we should maintain geology maps at 1:20 000 scale for most of New Brunswick and at 1:10 000 scale where the data is warranted, forcing the Geological Surveys Branch staff to find an alternate source for base maps. The Branch tried to produce base maps by contracting them out to MRMS (LRIS, Amherst). This cost about $125 000 per NTS sheet (25-1:10 000 map sheets). The Branch also tried to produce 1:20 000 base maps by photogramatically reducing 1:50 000 maps and redrafting them at 1:20 000 scale.

The Minerals and Energy Division has been involved in the collection of geoscience data by several geoscientists for the past 50 years. To date, these data are available in hard copy only. Geoscientists need all the collected data in an integrated form in order to properly manage mineral resources.

GEOGRAPHIC INFORMATION SYSTEM (GIS) PILOT PROJECT

R.R. Irrinki, Senior Geologist

The purpose of the project is to evaluate the potential of GIS (Geographic Information Systems) techniques (using the locally developed CARIS software), especially to superimpose data from various maps showing geoscientific information. The techniques that are being tested must also allow the retrieval of cartographic and descriptive data as determined by the search criteria defined by the user. The project will then evaluate the use of CARIS as a resource management tool for the Minerals and Energy Division.

The area chosen for the pilot project is NTS map sheet 21 O/8 (one of 90 such sheets in N.B.) because of the availability of LRIS standard digitized base maps and preplotted assessment data. This map sheet contains twenty-five 1:10 000 base maps. Assessment data related to geology, geophysics, and geochemistry were plotted on one hundred and twenty 1:10 000 scale hard-copy maps.

Le but du projet est l'évaluation de l'utilité possible des techniques des SRG (systèmes d'Information Géographique) en utilisant les techniques CARIS de source locale, surtout pour la superposition les données de cartes à données géoscientifiques. Les techniques à l'essai doivent permettre la récuperation des données cartographiques et descriptives en suivant les critères de recherche etablies par l'utilisateur. Le project évaluera alors l'utilisation de CARIS comme outil de gérance pour la Service des Minéraux et d'Energie.

La région choisie pour le projet pilote est la feuille 21 O/8 du STN (une de 90 feuilles semblables au N.B.) à cause de la disponibilité des cartes de base du RTSI (régistre de terrain en système informatisé) et données d'évaluation minière déja sur cartes. Cette feuille renferme vingt feuilles de carte de base à 1:10 000. Les travaux statutaires en géologie, géophysique et géochimie sont mise en carte sur un cent vingts feuilles à l'echelle de 1:10 000.

GEOSCIENCE INFORMATION SYSTEM

INTRODUCTION

The Geological Surveys Branch approved a pilot project to establish the Geoscience Information System (GIS). After six months of negotiations, on June 29, 1989, the Geological Surveys Branch of the New Brunswick Department of Natural Resources and Energy accepted financial assistance ($225 000)

offered by the Department of Commerce and Technology. The offer is under the Industrial Innovation and Technology Development Subsidiary Agreement and is for the purchase of GIS hardware and the cost of consulting to customize the CARIS (Computer Aided Resource Information System) software to the Geoscience Information System (GIS).

Configuration of the hardware consists of one Spark 370 Server, one SUN 4 workstation, one 48" X 36" size pen plotter, and one 48" X 36" size digitizing table (Fig. 1). UNIX is the operating system; CARIS is the GIS software and INGRES is the relational database.

The main purpose of the project will be to evaluate the potential of GIS techniques, especially for superimposing data from various maps showing geoscientific information. The area chosen for the pilot project is NTS map sheet 21 O/8, which can be divided into twenty-five 1:10 000 map sheets (Figure 2).

PRODUCTION SCHEDULE

The Minerals and Energy Division activities and the personnel responsible for these are diagramatically shown on Figure 3. A 12 month schedule was designed for the orderly completion of the pilot project and also to assist in the management of New Brunswick's mineral resources. The schedule (Table 1) consisting of 16 steps is briefly described below.

CREATION OF GEOGRAPHIC BASE MAPS (Steps 1, 2, and 3)

Geological Surveys Branch geologists obtain base maps from several sources: 1) Energy, Mines and Resources, Ottawa for 1:50 000 and 1:250 000 scale maps; 2) New Brunswick Department of Natural Resources and Energy for 1:10 000 and 1:15 840 scale base maps; 3) LRIS and MRMS for 1:10 000 scale base maps.

CREATION OF 1:10 000 DIGITAL BASE MAPS (Step 1)

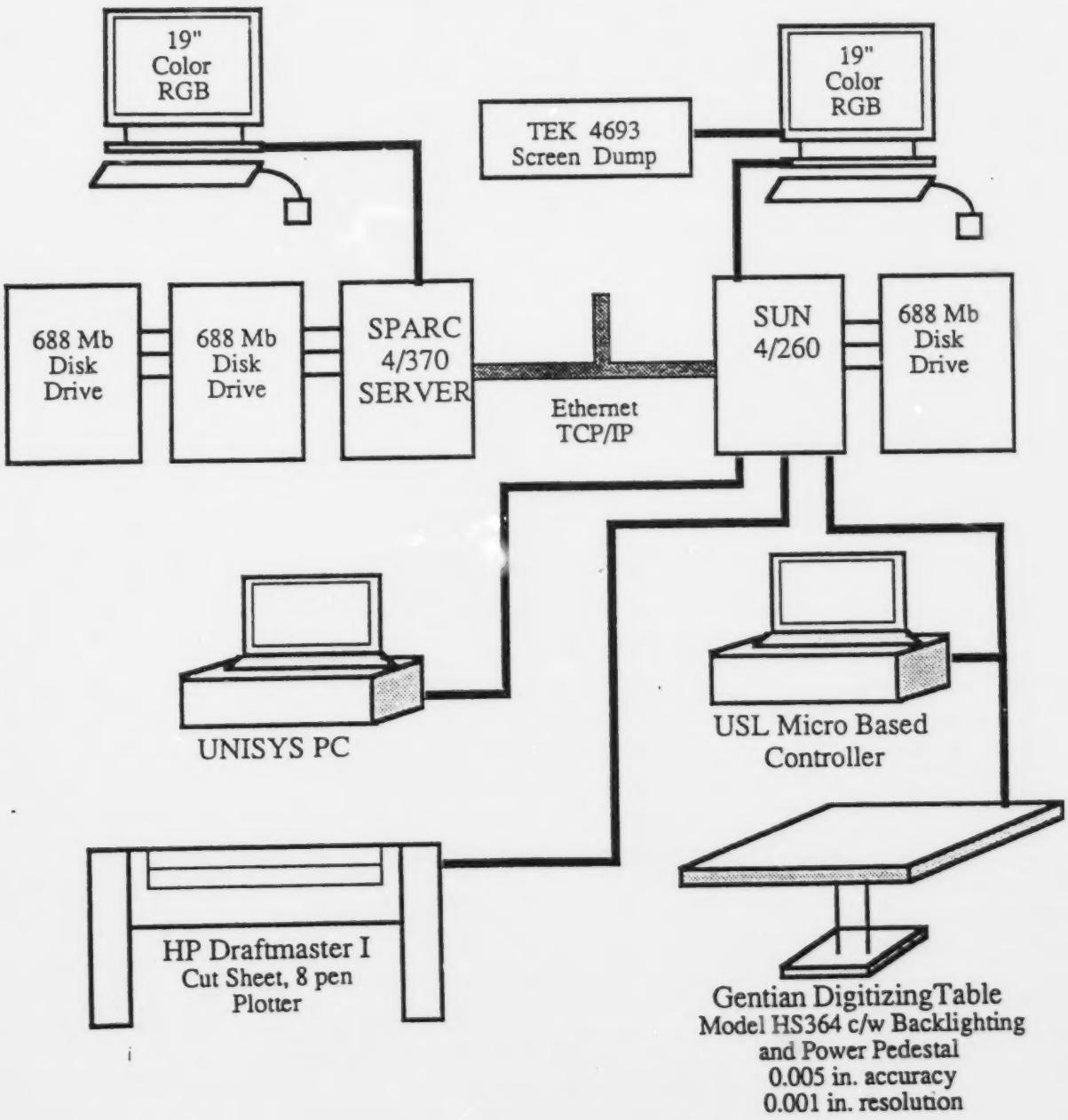
MRMS digitized 1:10 000 base maps for the 21 O/8 map sheet (project area) by using GEOBASE. These digitized files will be converted to the CARIS format. Hard copies will then be produced and compared with the existing 1:10 000 base maps. As the geocompilation data has been plotted on these base maps as several overlays, it is essential to have identical base maps for digitization of the data.

CREATION OF 1:20 000, 1:50 000, and 1:250 000 DIGITAL BASE MAPS (Step 2)

The 1:10 000 digital bases produced above will be used to create 1:20 000-, 1:50 000-, and 1:250 000-scale base maps. Hard copies produced from these digital bases will be compared against the existing 1:50 000 and 1:250 000 maps. Necessary corrections will then be made to suit the needs of the Minerals and Energy Division.

FIGURE 1

NB Department of Natural Resources
Minerals Division
CARIS Hardware Configuration



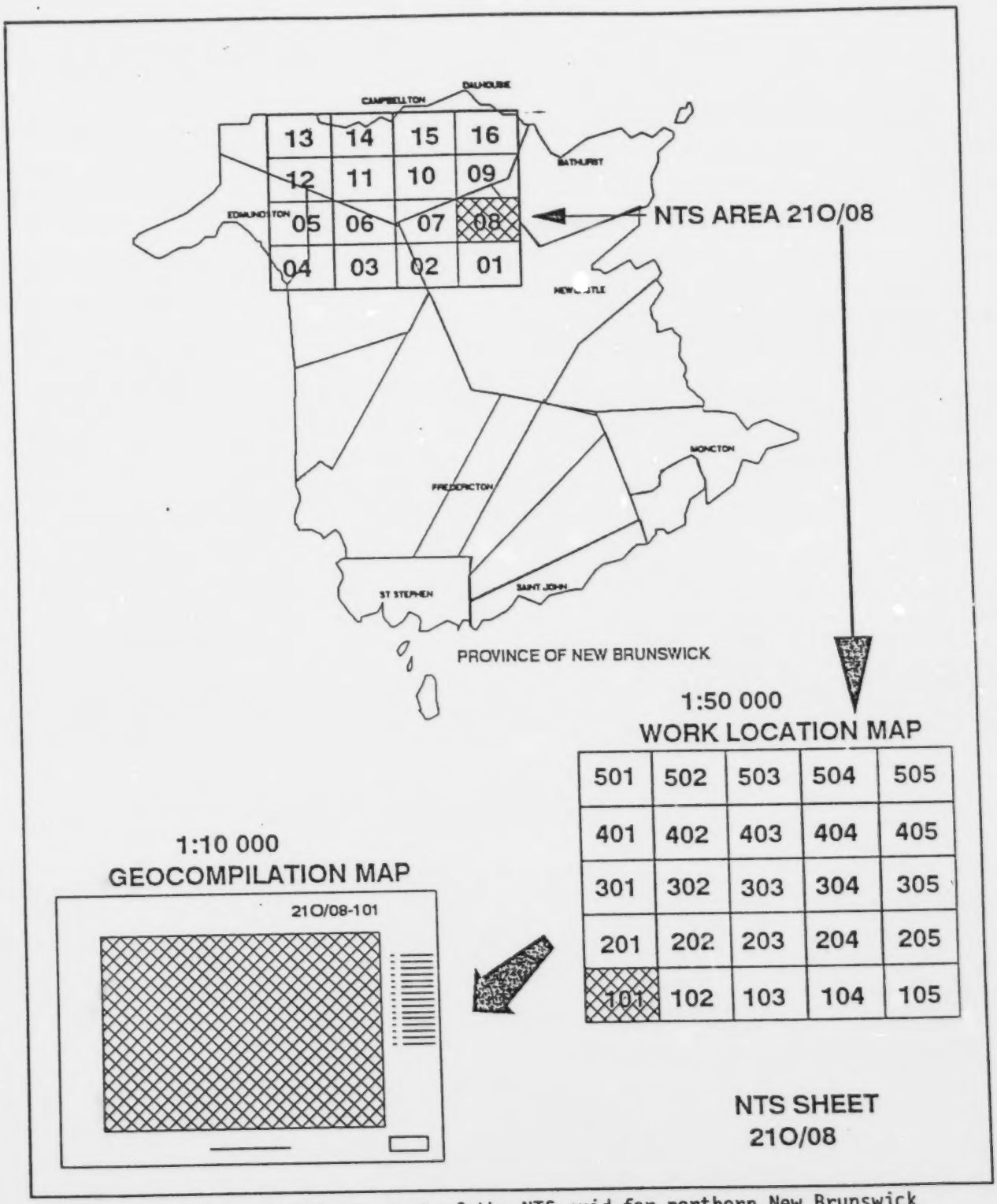
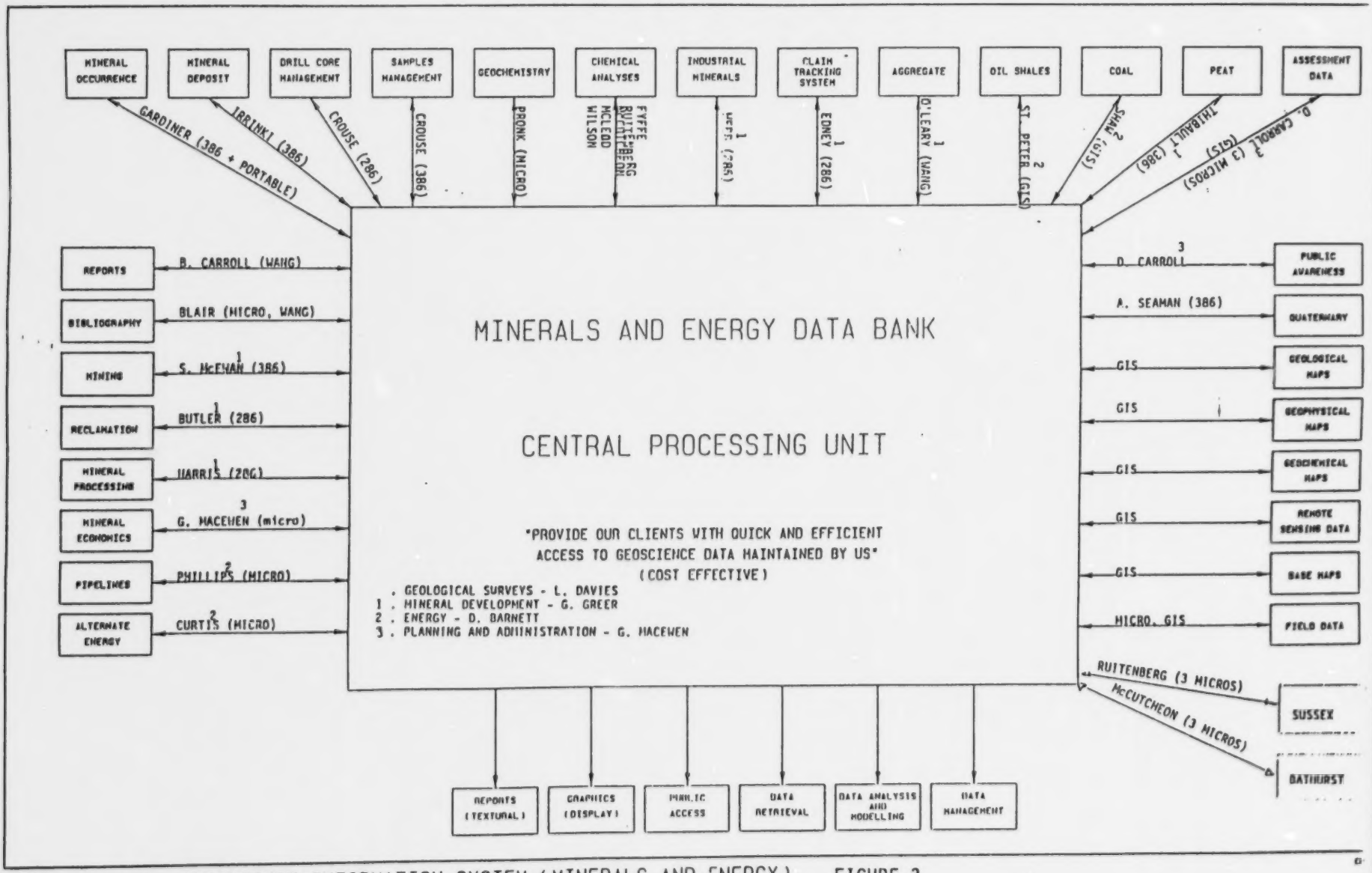


Figure 2. Index map showing part of the NTS grid for northern New Brunswick (21 O) and the location of NTS 21 O/8. The inset shows the numbering system for the twenty-five 1:10 000 geocompilation maps within 21 O/8.



"IDEAL" N.B. GEOSCIENCE INFORMATION SYSTEM (MINERALS AND ENERGY) FIGURE 3

WORK SCHEDULE	1	2	3	4	5	6	7	8	9	10	11	12
TRANSFER OF DIGITAL 1:10 000 (MRMS) BASE MAPS TO CARIS FORMAT	X											
CREATION OF 1:20 000, 1:50 000, AND 1:250 000 BASE MAPS (BOTH DIGITAL AND HARD COPIES) FROM THE ABOVE 1:10 000 BASE MAPS	X	X										
TRANSFER OF SCANNED 1:250 000 BASE MAP TO CARIS FORMAT		X										
DESIGN OF GRAPHICAL MENU TO DIGITIZE GEOSCIENCE COMPILATION MAPS		X	X	X	X							
MANUAL DIGITIZATION OF GEOLOGY MAPS (1:10 000, 1:15 840, 1:50 000, AND 1:250 000); SCANNING OF MAPS(?)				X	X	X	X	X	X	X		
CONVERSION OF MINERAL OCCURRENCE FILE (dBASE) TO INGRIS				X	X	X	X	X	X			
CONVERSION OF GEOCHEMISTRY FILES TO INGRIS				X	X	X	X	X	X			
CONVERSION OF MINERAL DEPOSIT DATA TO INGRIS						X	X	X	X			
CREATE AN INTERFACE TO INTEGRATE GSC GEOPHYSICAL DATA TO CARIS						X	X	X	X			
DIGITIZE CLAIM MAP (1:50 000) AND INTEGRATE CLAIM TRACKING SYSTEM (dBASE) TO CARIS (INGRIS)						X	X	X	X			
DIGITIZE MINING LEASES, RECLAMATION								X	X			
DIGITIZE SURFICIAL GEOLOGY, INDUSTRIAL MINERALS, AND GRAVEL PITS, ETC.									X			
INTEGRATION OF SPATIALLY REFERENCED DATA								X	X	X		
SPATIAL ANALYSIS AND MODELLING							X	X	X	X	X	
DEMONSTRATION AND PRESENTATION									X	X	X	X
DOCUMENTATION										X	X	X

CREATION OF 1:250 000 BASE MAPS USING SCANNED DATA (Step 3)

The 1:250 000 vectorized scanned base maps are available from Energy, Mines and Resources, Ottawa. The digital data created by using INTERGRAPH software will be converted to CARIS format. A hard copy will then be produced and compared to the existing map.

DESIGN OF GRAPHICAL MENU (Step 4)

A graphical menu will be designed to digitize geological, geophysical, and geochemical maps. In order to digitize large amounts of geoscience compilation maps, development of specialized graphic digitization interface menus for each type of map is critical.

MANUAL DIGITIZATION OF GEOSCIENCE MAPS (Step 5)

Geoscience data containing lithology, structural geology, mineralization, mineral deposits, drill holes, geophysical, and geochemical anomalies are compiled from the assessment files and are plotted on 1:10 000 maps. There are 120 such maps in the 21 O/8 NTS map sheet and are available only as hard copies.

Besides the geoscience compilation maps, geological maps are available on 1:15 840, 1:50 000, and 1:250 000 scale.

Although manual digitization is planned for most of these maps, we will explore the possibility of scanning a few maps.

CONVERSION OF MINERAL OCCURRENCE DATABASE (Step 6)

The data on 800 mineral occurrences have been maintained by "New Brunswick Computerized Mineral Occurrence Database", which is managed by several dBase files.

Mineral occurrences within the 21 O/8 NTS map sheet will be retrieved from the Mineral Occurrence Database. A conversion program will be made to transfer dBase files to the alpha-numeric database of the system (INGRES). This point data will be incorporated with the other geoscience data.

CONVERSION OF GEOCHEMISTRY FILES (Step 7)

Most of the geochemical data are plotted on 1:50 000 geographic bases. Some of the data are also stored as a computer file on an IBM mainframe computer. A conversion program will be developed to transfer geochemistry files to the alphanumeric database of the system (INGRES). After the batch digitization of this point data, hard copies will be produced in association with the other geoscience data.

CONVERSION OF MINERAL DEPOSIT DATABASE (Step 8)

Data on several mineral deposits are managed by dBase files.

A special software package by GEOSTAT SYSTEMS INTERNATIONAL INC. has been used to manipulate these data. A conversion program will be made to transfer the mineral deposit database files to the alphanumeric database of the system (INGRES). The DXF format graphic files consisting of three-dimensional data will then be transferred to CARIS format.-

INTEGRATION OF GEOPHYSICAL DATA (Step 9)

Both hard copies and digital tapes of airborne geophysical data, such as magnetic, VLF, and gravity are available from Energy, Mines and Resources, Ottawa. An interface will be developed to integrate EMR geophysical data to the system.

Remote sensing data will also be incorporated with the geophysical data.

CLAIM TRACKING SYSTEM (Step 10)

The Mineral Development Branch of the Mines Division keeps track of the claims staked in the Province by using a Claim Tracking System, that is managed by dBase programs. Claims are manually plotted on 1:50 000 scale maps and are frequently updated.

The 1:50 000 claim map for NTS 21 O/8 map area will be digitized manually. A conversion program will be made to transfer the Claim Tracking System to the alphanumeric database of the system.

MINING LEASES AND RECLAMATION (Step 11)

Mining lease boundaries and reclamation plans are usually plotted on 1:50 000 maps. Mining plans for past and present mines are available at various scales. There is only one existing mine within NTS 21 O/8. Maps showing mining leases, mining, and reclamation plans will be digitized manually.

BIBLIOGRAPHICAL DATA (Step 12)

Bibliographic references for New Brunswick geological publications are available on a MULTIMATE word-processing package. The references for 21 O/8 will be retrieved from the New Brunswick Reference File. A conversion program is necessary in order to convert from the existing software package to the alphanumeric database of the system (INGRES).

DEVELOPMENT OF AN INTEGRATED SYSTEM OF SPATIALLY REFERENCED DATA (Step 13)

The integration of the above digitized files and associated alphanumeric database will form a framework for the Geoscience Information System. The integrated system will be tested to allow the following output:

1. Creation of documents identical to the original ones;
2. Merging of display files;
3. Retrieval of graphic elements from the merged display files;
4. Data retrieval according to search conditions;
5. Production of various drawings with a pen plotter and copies from a colour screen.

SPATIAL ANALYSIS AND MODELLING (Step 14)

Spatial analysis involves combining data from multiple spatial data sets (geology, geophysics, mineral occurrences, etc.), and performing spatial analysis techniques and modelling on the GIS data sets to transform the data into information suitable for a given purpose. As an example, if an exploration company is looking for exploration targets, data sets containing geology, geophysics, geochemistry, mineral occurrences, and mineral deposits should be combined in order to retrieve the data having the best coincidental anomalies.

DEMONSTRATION AND PRESENTATION (Step 15)

The pilot project will be carried out in close cooperation with geologists, engineers, and computer scientists. In order to receive continuous feedback, a demonstration of the system and output at all stages is essential.

After the initial digitization of various data sets, a demonstration will be given to department personnel. Any suggested changes would then be made to the system. A further demonstration would be given to exploration and mining companies operating in New Brunswick.

The system is expected to be ready by October 1990 and, if so, it will be demonstrated at the Minerals and Energy Division Fifteenth Annual Review of Activities. However, if a major part of the system is ready for demonstration by March 1990, it will be presented at the Prospectors and Developers Convention in Toronto.

DOCUMENTATION (Step 16)

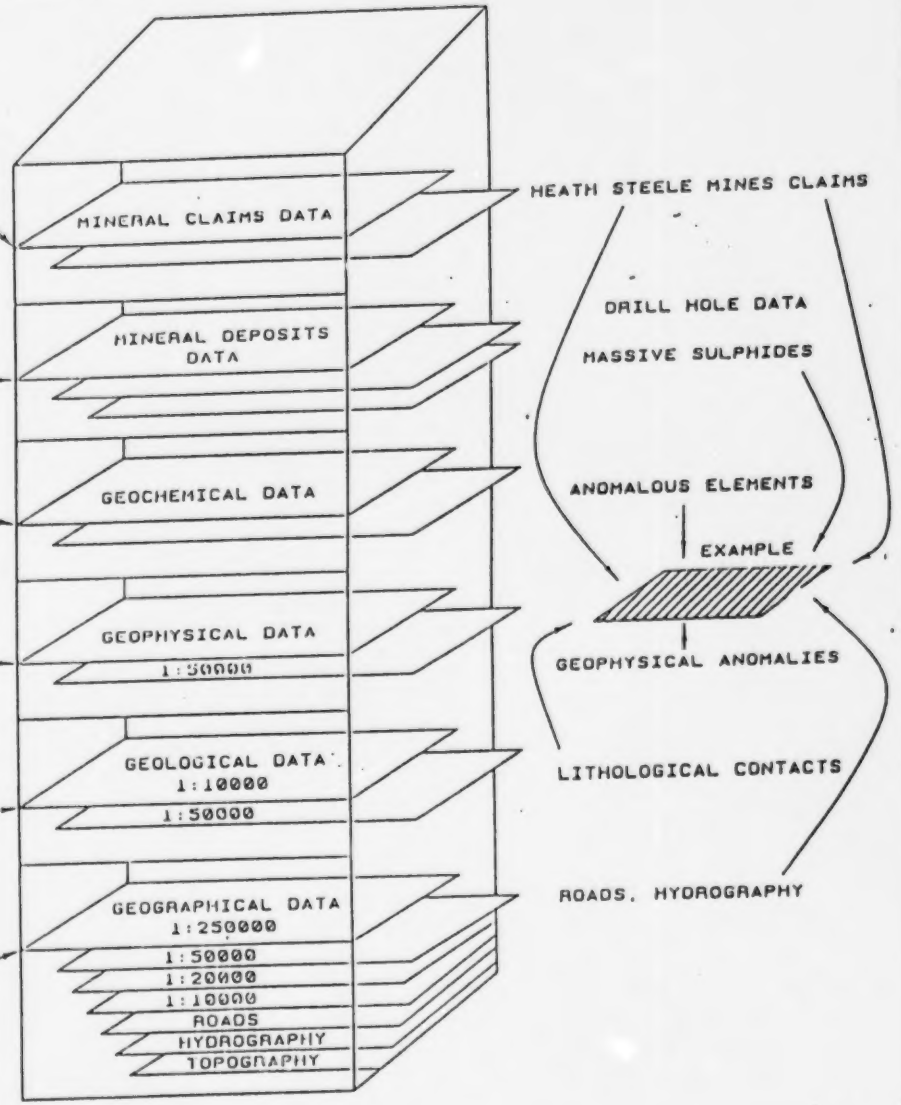
The system will be documented and published as a Topical Report, and will be available from the Minerals and Energy Division of the New Brunswick Department of Natural Resources and Energy.

PRESENT STATUS ON GIS PILOT PROJECT

The Geological Surveys Branch Geoscience Information System has been set up as configured and is located in Room 176 at the Hugh John Flemming Forestry Complex. The schematic diagram (Figure 4) shows the layers of data incorporated into the system.

SPATIALLY REFERENCED DATA RETRIEVAL AND INTEGRATION

ATA TYPE	SOURCE	DATA FORMAT
RAL CLAIMS NG LEASES	N.B.M.D. - 1:50000	HARD COPY-GRAPHICAL & ALPHANUMERIC (DIGITAL)
AMATION	N.B.M.D.	HARD COPY
ERAL DEPOSITS	N.B.G.S. MINERAL DEPOSITS FILE N.B.G.S. MINERAL OCCURRENCE FILE	ALPHANUMERIC (DIGITAL)
CHEMICAL	G.S.C. - 1:50000 N.B.G.S. - 1:50000-DIGITAL	ALPHANUMERIC (DIGITAL) ALPHANUMERIC (DIGITAL)
PHYSICAL	PRINCE ALBERT - LANDSAT THEMATIC DATA - 7 BANDS U.N.B. (MDA) PROJECT) 1:10000 EMR - AEROMAGNETIC, ELECTRO-MAGNETIC AND RADIOMETRIC DATA 1:50000 (10 LAYERS)	RASTER ALPHANUMERIC GRAPHICAL (DIGITAL) RASTER
LOGICAL	U.N.B. (MDA PROJECT) 1:10000 G.S.C. 1:50000	GRAPHICAL (DIGITAL) HARD COPY
SE MAPS YDROGRAPHY, OPOGRAPHY, OADS)	N.A.M.S. - L.A.I.S. 1:10000 N.A.M.S. - L.A.I.S. 1:20000 COMPILATION FROM 1:10000 N.A.M.S. - L.A.I.S. 1:50000, COMPILATION FROM 1:10000 E.M.R. - VECTORIZED RASTER DATA 1:250000	DIGITAL DIGITAL DIGITAL DIGITAL



EMATIC REPRESENTATION OF GEOLOGICAL SURVEYS GIS DEMO (FIGURE 4)

The digital geographic data which were originally digitized by using several software packages such as GeoBased, CARIS, Autocad, Intergraph, and ARC/INFO were converted to CARIS NTX format. Hard copies were then produced at 1:10 000, 1:20 000, 1:50 000, and 1:250 000 scales. These bases mainly contain hydrography, topography, roads, and place names.

Feature codes and symbology were made for the various features in geoscience. Several graphical menus were then created for faster and easier digitization of geoscience data.

Six geoscience compilation map sets were manually digitized at 1:10 000 scale. Each map set contains geology, geophysics, geochemistry, and annotation layers. Nineteen map sets are remaining for the manual digitization.

Geology maps at 1:50 000 scale and detailed geology maps around mineral deposits were incorporated into the system.

Mineral occurrence data, metallic mineral deposits data, geochemical data, and sand and gravel pit data were converted to INGRES. The querry modules are in progress.

The geophysical data contining 10 layers and seven layers of Landsat data were also incorporated into the system.

The claim map showing the location of several hundreds of claims and two mining leases was manually digitized at 1:50 000 scale. The data maintained by dBase files were converted to INGRES. The querry module for the Claim Tracking System is in progress.

Spacial analysis and modelling will be carried out only after the completion of all digital data sets..

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 17, 1990

A GIS USER'S VIEWPOINT

by

Darrell Fowler
Natural Resources

Our GIS group is comprised of thirteen people, three of whom are involved with hardware and software maintenance, while the rest are for the most part are concerned with database maintenance. Our prime reason for existing is to provide information to the Forest Management Planners who will use the database as an initialization for the wood supply model. The model is used, in turn, to calculate an estimate of the amount of wood that can be cut anually while maintaining a stable wood supply to New Brunswick mills. Others who are interested in the GIS Forest database are members of the Wildlife habitat group within the Fish and Wildlife Branch (NDRE). They have a direct link into our system and are using it to look into wood supply management plans from the point of view of what effect management of the forest for production of wood will mean to the availability of wildlife habitat. In the past few years, they have added routines to the wood supply model, so that the output can include not only cubic metres of wood available to be harvested, but also the amount of habitat that will be generated or removed from certain species of wildlife as a result of harvesting.

We also supply data to our five DNRE regional offices, to 10 holders of crown timber licenses and to Forest Products marketing boards. Many of these offices are equipped with micro computers to which are attached Bernoulli cartridge disk drives. On request, we provide to these users, polygon attribute files in ASCII format for the forest covertype maps within their are of interest. Dbase III or INFO can be used on the micros to generate area summaries and to search for specific forest types. For example, a marketing board could search the attribute files and generate a list of map numbers - stand number combinations of polygons which describe areas of over mature timber. It is then possible to locate these by hand on hard copy maps and in turn approach land owners and advise them to harvest or risk losing the wood to wind throw.

Three of the licenses, Irving, Fraser, and NBIP all have Arc Info GIS systems, and we regularly exchange with them complete coverages which include both attribute and spatial data.

To give you an idea of the GIS setup at Timber Management Branch, our software is Arc Info, version 5.0, and the hardware is as follows:

- Prime 4150 mini computer with approximately 4 gigabytes of disk storage
- SUN 370 server
- 4 SPARC1 work stations
- Calcomp 5735 black and white electrostatic plotter
- several terminals and micro computers

The above are linked together by LattisNet. This particular type of Network was chosen as it works on the twisted pair communication wiring that already existed in the building.

The database currently takes up about 2 Gigabytes of disk storage on the PRIME leaving the other 2 Gigabytes available for resident software and more work space. All database updating takes place on the SUN work stations leaving the PRIME CPU available for data analysis and to a lesser extent, cartographic output.

New Brunswick is covered in our system by about 1900 forest covertype maps, each of which have an average of about 400 polygons. Each of these polygons are differentiated from the others on the basis of species composition, crown closure, and maturity class. The reason for splitting the forest up into stands is that we are attempting to segregate areas of forest in which a management decision or treatment of any type would result in a uniform response throughout that segregated area. For example, if a stand is cut, one would expect it to regenerate uniformly within that segregated area. Through sampling, it is possible to determine how a stand will look and how much wood volume will be present any number of years in the future. The wood supply model looks at what is present today and what a specific stand would look like in the future and queues stands for harvesting.

Digitizing of forest covertype maps commenced in late 1982 and finished in early 1986. In 1984, it became evident there was a problem in that the forest information was already two years out of date. If one is to make any kind of accurate predictions about how the forest will develop, it is important the starting conditions be as accurately defined as possible. It was therefore decided to set up a system to handle the task of inserting harvest and silvicultural information into the database on a regular (annual) basis.

Seven characteristics which were identified as being those which an updating system would have to take into account :1

1. all changes must be geographically referenced by an XY coordinate system (N.B. Double Stereographic Grid).

2. there must be no loss of information. If an area on a map is cut, the information (spatial and attribute) that will be overwritten must first be saved into another coverage for historical reference.

3. the system must be flexible. If there is a new type of update becomes important in the future, it should be relatively easy to incorporate it into the current system.

4. the system must accomodate continual updating. Cuts and silvicultural treatments carreied out on crown land must be entered into the digital base annually while harvest information on private land must be able to accomodate these changes.

5. selective query should be supported. Data must be segregated to avoid inefficient access, but also must be linked to allow complex searches if required. This can be achieved through the use of relatonal databse management software and proper database design.

6. the system must allow for inclusion of survey data. Information gathered in surveys of cutover areas, silviculture treatments, budworm defoliation, etc. should be linked to the actual polygons so as to allow users the option of accessing this more detailed information wherever it is available.

7. complete stand history should be maintained from the time of first disturbance. After an area of forest has been altered by cutting, fire, thinning, etc., it will be assigned a 9 character identifier, and that as well as any further interventions will be documented in the database.

Updating is a two step process, (1) cut polygons are digitized and intersected with the original forest cover type map to produce the the history cover. This cover will contain the original polygon boundaries, descriptive attributes and the 9 character harvest identifier.

The next step is to insert the cut polygons into the forest covertype map to create the updated version. To tie the whole system together, there is the stand diary file which is updated automatically by the update process. This file provides a link from the present map to the historical cover, and also to the detailed descriptions of disturbances which took place on those sites. It is possible, for example, to use the database manager to set up a relate environment within Arc Info to use the stand diary file to perform a search for all 1983 cuts that took place on hardwood sites.

One can get more complicated by searching for 1983 cuts on hardwood sites, that were harvested using chainsaws and skidder and subsequently planted. The stand diary file is important in that it enables the user to access, information on the current and past conditions along with all documented interventions on a specific site, all within one query session.

New updates which are are currently being incorporated into our system are slow changes like budwork infestation and forest aging which are important factors to consider as some of the polygon descriptions are based on 1981 aerial photography.

Work is currently going on at the University of Moncton (Edmundston Campus) and at Natural Resources to investigate the possibility of using satellite imagery to incorporate these slow changes into the database. That approach has shown some promise and it is hoped that it will allow us to keep the database current and at the same time, avoid the expense of rephotographing the province every few years.

Literature Cited

1 ERDLE T. AND ANDREWS P. "Updating and Maintenance of a GIS based Forest Inventory", Proceedings of Making it Work, Vancouver, B.C. March 1990.

D.N.R.E.

TIMBER MANAGEMENT BRANCH

TIMBER MANAGEMENT PLANNING SECTION

G.I.S. GROUP

MANAGER
PROGRAMMER
SYSTEM ADMINISTRATOR
OPERATOR
PRODUCTION SUPERVISOR
UPDATE COORDINATOR
7 DIGITIZING TECHNICIANS

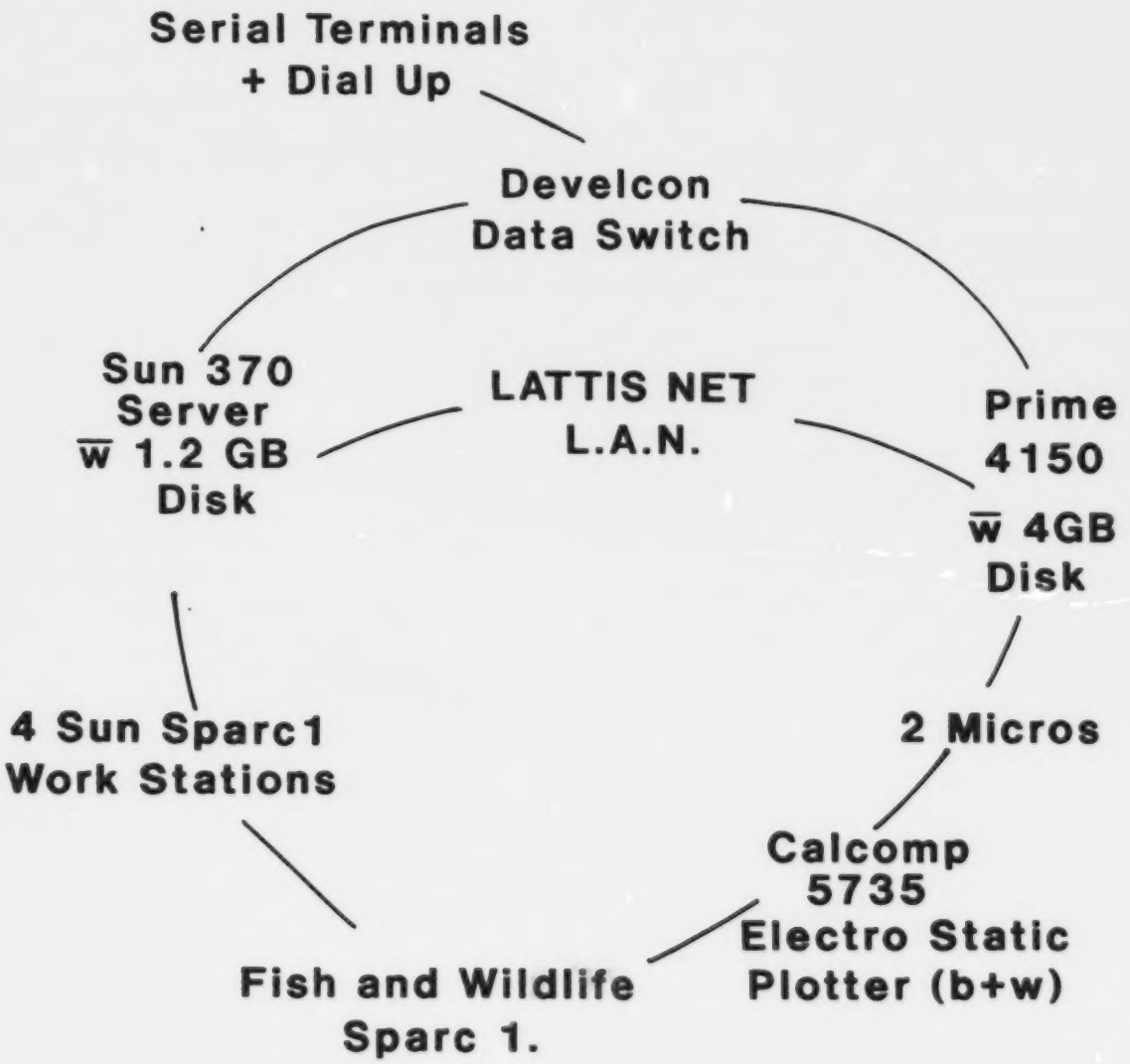
13 TOTAL INVOLVED IN HARDWARE, SOFTWARE & DATA BASE MAINTENANCE

GIS USERS:

PLANNERS IN TMP SECTION
FISH & WILDLIFE BRANCH
DATA SUPPLIED TO DNRE REGIONAL OFFICES, LICENSEES & MARKETING BOARDS.

SOFTWARE: ARC/INFO Ver. 5.0

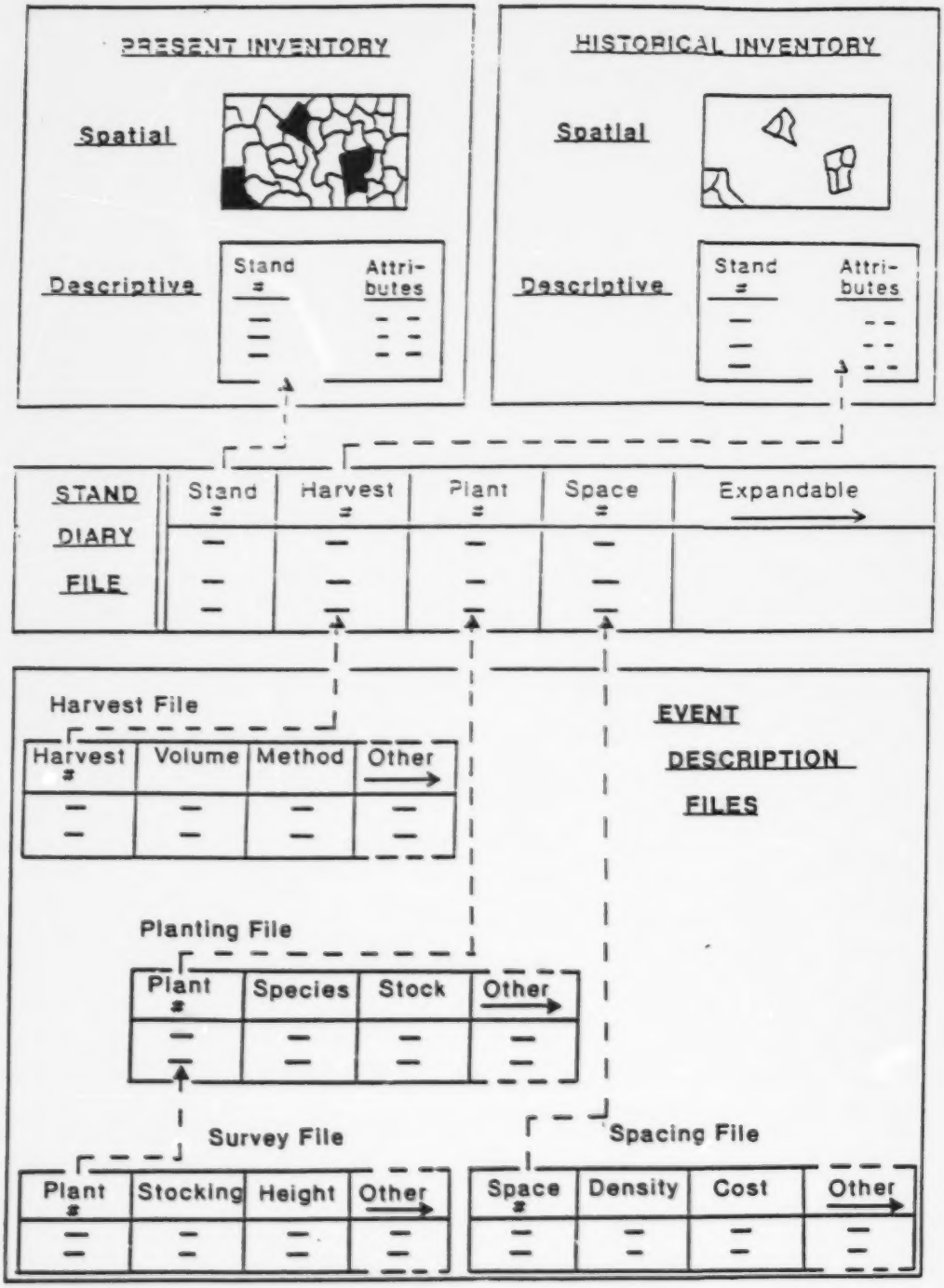
HARDWARE:



UPDATE SYSTEM CHARACTERISTICS

1. ALL CHANGES MUST BE GEOGRAPHICALLY REFERENCED
2. THERE MUST BE NO LOSS OF INFORMATION.
3. SYSTEM ARCHITECTURE MUST BE FLEXIBLE.
4. SYSTEM MUST ACCOMODATE CONTINUAL UPDATING.
5. SELECTIVE QUERIES SHOULD BE SUPPORTED.
6. SYSTEM MUST ALLOW INCLUSION OF SURVEY DATA.
7. COMPLETE STAND HISTORIES SHOULD BE MAINTAINED FROM THE TIME OF FIRST DISTURBANCE.

Erdle T. and P. Andrews. "Updating and Maintenance of a GIS – based Forest Inventory", Proceedings of Making It Work, Vancouver, B.C., March 1990.



Erdle T. and P. Andrews. "Updating and Maintenance of a GIS – based Forest Inventory", Proceedings of Making It Work, Vancouver, B.C., March 1990.

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 17, 1990

A GIS USER'S VIEWPOINT

by

Carol Young
Department of Transportation

I have been with DOT for about eight years now, and I was involved with the GIS pilot project that took place about a year and a half ago. Our project manager was from a user Branch, and I was the project leader on the pilot.

First of all, I want to make an announcement about our demo that is mentioned in the program that everyone got yesterday. Due to the unavailability of equipment, we are going to be unable to provide the demo for you today. Originally, our pilot project was developed on a VAXS VMS system, and it has since that time been converted to a UNIX platform. It is running currently on a SUN WORKSTATION, at Universal Systems Limited, and it is available for viewing on that platform. Unfortunately, that particular equipment was not available for today. Anyone who is interested in seeing a demo of what we developed during our pilot, please get in touch with us at Information Systems, DOT - either myself or Emilia Sousa, and we can certainly arrange to have something set up for you.

It was over six years ago when Emilia first joined our branch at Department of Transportation. She tells us that the second week on the job one of the branches within our department, the Right-of-Way Branch, had started her for a system. They had a definite requirement in their branch for automating some of their procedures. The word "GIS" wasn't used at the time but the concept was basically GIS - that's what they were talking about. Unfortunately back then we had a lot of other work, and a lot of different priorities in the Department of Transportation, so in fact we never did get around to doing that particular project until almost two years ago. At that time, a project viability assessment was done by a consultant that we contracted through Information Systems. That initial PVA, beyond a doubt, identified the potential for GIS applications within that particular branch. The recommendation from that report was to do a PVA for the entire department looking at all the possible applications, not only those in the Right-Of-Way Branch. That particular PVA was never done. Meanwhile, a GIS system was being developed, under the guidance of Dr. Sam Masory, over at UNB. He left there about four years ago, to found his own company, USL (Universal Systems Limited), the main objective of that company being the development and marketing of the proprietary GIS software called CARIS. No GIS system of any type had been implemented yet in a Transportation environment. A couple of proposals had been made to a couple of the United States, and one Canadian province, but that is about as far as it had gone. Around the same time we learned of a variety of Commerce and Technology grants that seemed to be available for the development of local technology.

After a few contacts with Commerce and Technology, we realized that Department of Transportation and Universal Systems Limited, in conjunction could probably benefit a great deal from one of these grants if we wanted to pilot a DOT GIS application, using the CARIS software. We knew no money at that time, in the Department of Transportation budget, for GIS development, but at least we then had the right combination of factors to get the project started. We had the Right-of-Way branch desperately needing help, especially in their property management area. We had a possibility of a grant from Commerce and Technology, we had LRIS, who at that time was using CARIS software for development of all their basemaps, and we made some contacts with RTI, (now renamed INGRES CORP.), and found that they would be willing to lend us the INGRES software for the duration of a pilot. USL agreed to lend us the CARIS software for the duration of the pilot and lastly, we had a VAX 3600 at the Department with a bit of capacity left on it to do a small pilot in this area. So we

had all the right factors in place. Information Systems together with the Right-of-Way Branch, put in a joint proposal with Universal Systems Limited, and presented it to Commerce and Technology. We wanted funding for all the necessary equipment to do the pilot; funding for consulting resources during the pilot; and also, space.

Approval for this grant was given in less than a month after it was submitted. The pilot was originally set for a duration of seven months, and later expanded to nine months, so it took place starting in January 1989 until September 1989.

We had six (6) basic objectives which we set out to accomplish over the life of the pilot project. What was important for our department, was to gain an understanding of GIS technology as it could apply to transportation. We also wanted to evaluate the CARIS software. This was the software that was being recommended to government departments who were going to be implementing any type of GIS, and we certainly wanted to do our own evaluation as soon as possible. We wanted to develop an application for the Right-Of-Way Branch as a means of accomplishing the first two objectives. By this I mean that it wasn't our only objective to do an application that we would put into place in the department and use as a production system. We had some objectives in mind and in order to accomplish those objectives, the application development was a means to an end.

The pilot was going to benefit both USL and ourselves. Objectives for USL included that they would be able to develop an application that could be marketed or at least the basis of one to be marketed. Department of Transportation would be able to aid somewhat in the marketing of the CARIS product - through presentations, industry contacts that we knew of, at various conferences and symposiums that we go to annually. USL and DOT together could do the development work, creating a learning experience, shared between the two parties.

There were potential benefits for parties on both sides. USL would be able to hopefully at least have the beginnings of an understanding in the Transportation world, since this was a new field for them, and having at least the basis for an application, they would get something valuable out of the pilot. For us, we would be able to learn about GIS technology. We would be able to possibly identify the potential applications within our own department. We would try to get a handle on what the real costs were going to be for such a project. There wasn't a lot of experience out there and hopefully, we thought, through a pilot, we would be able to determine what the cost could be for the development of a full scale project and as well, hoped to gain some insight into what it would cost to run such a system on an ongoing basis. Also, we wanted to be able to acquire hardware that would be able to be used for current and future projects. We also wanted to be able to gain some digitizing experience. Users in our department had no experience with it and we wanted to be able to produce some of our maps in a digital form, so that they could be used for future applications as a base.

We set up a steering committee for the project, as we do for most of our Information Systems projects. There were representatives from the user area, Information Systems, and the private company that was involved in the project. Since the pilot was going to take place in the Right-Of-Way Branch, the Steering Committee consisted of a Senior Manager from the department, the Executive Director of Engineering Operations, the Director of Information Systems, as well as the Director of the Right-of-Way Branch. On the project team we had a user as project manager from the Right-of-Way Branch, we had a project leader from Information Systems, and two technical resources, one from Information Systems and one from the Right-of-Way Branch - a technician from that area. As well, five or six USL consultants got involved in the project.

The first step in the project was to select a geographic area that we could work with. This was done in conjunction with knowledgeable users from our department, from the Right-of-Way Branch, the Design Branch, and the Planning Branch. We were looking for a number of criteria to be met before selecting a certain area. We wanted our pilot area to be quite a complicated stretch of highway, involving a lot of different roadway features, wanted to have a curve present, some ditching done, signing, lighting, etc. so that we could test as many features of the system as possible.

Also, it was important for us to have as much data already available on that area as possible, so that we wouldn't have to go out into the field, do surveys, and take notes. We wanted our Design Branch to already have done some design surveys on the area, or to be in the process of doing them; we also wanted to have the Right-of-Way Branch to have done some retracement surveys on the area to give us even more data. Also, we wanted an area that our Planning branch would have been studying for future use or was currently studying, and possibly somewhere that future upgrading was being considered. If this project did turn out, we wanted to be able to take the data that we had worked with and the application that we developed and put it into production right away. We finally made a decision, and ended up picking a section of the Trans Canada in the Moncton area, a two kilometer stretch of the Trans Canada Highway from Magnetic Hill to the Mapleton Road. That area met all of our criteria. This was one of the hardest parts of the project start-up, believe it or not. Next, we had to select hardware and software, and that was the easiest part. At the time, the CARIS software didn't run on many hardware platforms, in fact, I believe, we might have had the only hardware platform that they ran on at the time, that being a Digital VAX Computer. The actual workstation that we bought is a Tektronix 4224. We also purchased a digitizer, as well as a digitizing controller from USL and a graphics tablet. We already had a plotter and a VAX 3600.

The software consisted of CARIS for the graphics work and INGRES for the application development.

Next we had to learn the system itself, and the GIS technology. We did this through a number of methods; we went on training, we went to conferences, we watched video tapes, we listened to audio tapes, we read books. We immersed ourselves in this type of activity as well as kept in contact with a lot of other users who had some experience in this field.

We then worked on developing the application. This was truly a recursive type of activity, along with the learning. We would develop a little bit, learn a little bit, change what we developed, learn a bit more, develop further. The project definition itself changed a lot during the life of the project as we learned more and realized what we could make use of within the product. We estimate, now that it is over, that three quarters of the time spent during the pilot was on learning, and a quarter of the time was spent applying the knowledge that we had gained to the development of the application. To start out with, the learning curve was quite immense. We took two or three weeks of solid training at the Universal Systems Limited office. A number of different international conferences were attended, so that we could pick up experiences from other users. This type of work was very necessary, and any GIS pilot project, I think, would not be nearly as successful without this type of exposure. We also worked with the system, hands on, for a period of nine months. The recommendations that we gave to our senior management and the findings that we presented were based the experience that we had gained over the nine months. The application that we finally ended up developing in order to meet the pilot project objectives was a Property Information System. It consisted of four separate databases:

Firstly, the graphics database. All LRIS property maps for the pilot area that we chose were entered (digitized) into the system. We updated those digitized maps with information from our own retracement surveys that had been done. This was done in two different ways, some were digitized manually. Also, we developed a batch digitization process, whereby coordinates could be entered, and a corresponding map could be produced from them.

We also gained from LRIS, in a digital form, their topographic map and loaded those into our system. We later found that for this particular pilot, these were of no use to us, however, we gained some experience taking a file from a different system and loading it into our own.

Second, Database: Property Information. Each parcel of land that was depicted in the graphics database had a record associated with it. These were imported from LRIS. In some cases we updated the information where we had further information on the properties that we owned.

Thirdly, we had a database specifically on those properties that DOT owned. These contained further information gained through the acquisition process, the interviewing process, and everything else that takes place in buying a parcel of land.

Finally, the acquisition database; which is the heart of the property management aspect of the system. All information obtained during an acquisition project is entered into this database. The intention was for that particular database to store the information that would be used as a project management tool for acquisition projects in the Right-of-Way branch.

Aside from the development of that application, we compiled, throughout the life of the project, a lot of material that would be used later on, should GIS have a future within DOT. We were made aware that DOT has an enormous amount of geographically referenced data that describes the infrastructure that transportation is responsible for. I'm not going to go through them, but they are listed here in three categories: point information, linear information, and polygon information, that now exists in Department of Transportation.

From this, it was easy to see that GIS application examples could be found for most activities within DOT. This is where another person came into the project, that I haven't mentioned yet. From ISG, we contracted Fred Kolls for a small period of time to do some research for us into the various applications that were potential for Transportation.

He looked into the various States, and provinces, DOT's through conference proceedings, papers, newsletters, personal contact, and who knows what else, to produce this compilation of potential GIS applications. We used this in our senior management report to our department and will be using it in the future when we study further into GIS potential in the Department of Transportation. Samples listed here include accidents, safety, signing, Design applications, property applications, three areas of our planning branch, road life studies, pavement management, highway maps, planning maps LIS's for subdivisions, permits, road networking, truck routing, finding viable paths through our highway network etc. The project team had exposure to a number of GIS applications throughout the life of this project. We spoke with a lot of people who had implemented GIS systems, not in Transportation mind you but, GIS systems in other fields. We drew upon the expertise of consultants who had been involved in costing GIS applications for other departments and what we concluded from all this talking and researching that to compare the cost that has been experienced by other people in implementing a GIS with that which you will incur is really not possible. It's like comparing apples and oranges. The scope of the problem that you have to solve in your own area, the size of the jurisdiction that you're trying to cover, the amount of digital data that is already available in an automated form somewhere and the number of planned users for the system, all have a profound impact on the cost of implementing a GIS. Also, we found things that we weren't expecting, like for instance, trying to compare DOT's from the United States with our own application, introduced a lot of errors since many of the states have significantly different mapping responsibilities than we do. We got into the "centralized versus decentralized" mapping responsibilities issues and found that there really are not two situations that are alike out there.

Based purely on the one application that we tried, and facing quite high data conversion costs, we found that it was impossible in the short term to cost justify this particular application, for implementation in our department. It was clear to us as well that from other GIS experience, that a property management system, as a stand alone system, has never been found to be cost justifiable within a department of Transportation only. There is a possibility, of course, of recuperating some of the high data conversion costs through sale, or exchange of data, and throughout the life of our project we did keep conversations and meetings going with LRIS on these types of topics, but nothing has been finalized or resolved as of yet and there is still a lot more work to do in that area.

This slide lists some of the benefits of GIS. I have taken this from a previous departmental presentation: Ability to display information gained by testing relationships between different data items. The ability to synthesize large amounts of data in order to do spatial examinations on it. The ability to make scale and projection changes, remove distortions, perform coordinate rotation and translations amazingly fast and easy. That is the digital mapping end of it - one of the most amazing things that you notice when you first get into this technology.

Capability to discover and display spatial relationships through the application of modelling, reduce data redundancy, improve data quality, improve deficiency and time loss. An interesting one, broader utilization of data due to a distributed processing environment. Also an interesting one that we found, greater interaction of personnel. There is such a potential to gain a greater understanding of the Department of Transportation as a whole by each individual unit, through the use of such a system. Each individual unit can see a lot more clearly with a system such as this, how they fit into the big picture and how their work contributes to the work of DOT as a whole, so this interaction of personnel seen as an advantage. In graphics display of results and customization, particularly useful for presentation type of material.

At the end of our pilot we presented alternatives for senior management to make a decision on. First option: we could do nothing for now. Say yes, it was a good concept, but we are going to wait a little while to see if other departments are going to pick up. We're going to see if something is going to be developed in another DOT first. We weren't recommending that one. Secondly, we could implement the application that we developed in the Right-of-Way Branch. Either we could just put it in as is, and quickly make use of it, or we could re-design it. Looking back on what we did, there were probably a thousand things that we would change, so a re-design was probably the best alternative, if we were going to be implementing the pilot. Thirdly, we could initiate, a DOT wide GIS feasibility study which would take into consideration a corporate view of these applications. This sounded a lot like the work that was already going on with our Information Strategy Plan. It seemed to fit. So in fact, what our senior management went with, was a variation on these recommendations. They wanted to see a full cost benefit analysis done on a few applications, and then they would prioritize those applications, a process which would have come as an end result of the Information Strategy Plan. It was decided that along with the interviewing being done for the Information Strategy Plan, and so as not to conflict with that process, extra information would be gathered, but a separate cost benefit analysis for this particular project was not going to be done at this time. What is currently going on an automated mapping application that we discovered a potential for, within one of our branches: the Planning Branch. It will involve automating the production updating of our full series of highway maps. So, what we are currently planning work on is a cost justification for perhaps a pilot in that area.

To sum up, I wanted to talk about some of the results. What did we really get out of the pilot, bottom line? We set out to achieve some objectives, we hoped to gain some benefits which I listed up on the screen earlier. We gained a lot of valuable insight into the technology. We saw what others did. We made a lot of contacts in a variety of different places for the future. We certainly became a lot better aware of what is involved in a project of this magnitude. The immense learning curve that is required. The training that one has to go through. The software evaluation techniques that are available for this type of software. The resources required and the support that is so very vital from the vendor of your GIS software. We got to see the capabilities of INGRES and in fact ended up buying a license for the INGRES database programming language for our site.

We learned about digitizing and producing maps digitally, linking graphics to attributes. This was a totally foreign concept to many people in our department prior to two years ago at the start of the pilot. We became a lot more attuned to the fact, that a data base design for such a complex system like a department wide GIS must be well thought-out and structured. The strong commitment at a high level is very important. We realized that this has to include a painful learning curve for those people as well, so you have to be prepared for that. Also, a strong well-educated, experienced project team, which should be made up mostly of people from your own department. Making an investment in those people's education will allow them to adopt the project and the system as their own. Using the system to do their own work and therefore, to have a vested interest in it, will end up in the producing of a truly homegrown product from within.

NEW BRUNSWICK DEPARTMENT OF TRANSPORTATION
G I S PILOT PROJECT

G I S PILOT PROJECT

BEGINNINGS ...

--> Right of Way Request

--> Project Viability Assessment

--> Universal Systems Limited

--> CARIS

--> Commerce & Technology Grant

G I S PILOT PROJECT

OBJECTIVES

1. Gain an understanding of GIS technology as it could apply to NB DOT

2. Evaluate the CARIS software

3. Develop an application for Right of Way branch as one of the means to accomplish objectives 1 & 2.

G I S PILOT PROJECT

OBJECTIVES

4. USL to develop an application that could be marketed (or at least the basis of one).

5. NB DOT would aid in marketing of CARIS through presentations and industry contacts at various conferences and symposia.

6. USL and DOT to do development work together creating a learning experience for both parties.

G I S PILOT PROJECT

BENEFITS TO DOT

- Learn about GIS Technology
- Identify Potential Applications
- Determine What the 'Real Cost' Would be
- Acquire Some Hardware to be Used for Future & Current Projects
- Digitizing Experience

G I S PILOT PROJECT

PLAYERS

STEERING COMMITTEE

Keith Hicks
Emilia Sousa
Red MacFadyen

PROJECT TEAM

Denis Lachapelle
Carol Young
Trevor Cookson
Richard Russell
Universal Systems Limited

G I S PILOT PROJECT

PROJECT STEPS

--> Select Pilot Area

--> Select Hardware & Software

--> Learn System and Technology -->

<-- Develop Application <--

G I S PILOT PROJECT

TIME SPENT

3/4	LEARNING	1/4	APPLYING

- training
- conferences
- hands-on experience

G I S PILOT PROJECT

DOT PROPERTY INFORMATION SYSTEM

- GRAPHICS
- PROPERTY INFORMATION
- DOT OWNED PROPERTIES
- AQUISITIONS

GEOGRAPHICALLY REFERENCED INFORMATION
- EXAMPLES -

POINT INFORMATION

- accident statistics
- traffic counts
- soils data
- bridge inventory
- maintenance records
- photo logs
- sign inventory
- ferry landings
- wharves

LINEAR INFORMATION

- pavement types/strength
- surface distress/ride comfort
- shoulder width
- ditch configurations
- video log
- centre line geometry
- interchange layout/flow
- designated highways
- arterial highway program

GEOGRAPHICALLY REFERENCED INFORMATION
- EXAMPLES -

POLYGON INFORMATION

- property ownership
- socioeconomic data
- district/county records
- maintenance records
- weather data
- subdivisions
- geological information
- environmental information
- etc.

SOME POTENTIAL G I S APPLICATIONS

TRAFFIC BRANCH

- accident analysis system
- highway safety program system
- traffic ordinance management system
- sign & pavement marking inventory system
- signing system studies
- traffic studies
- lighting inventory management system

DESIGN BRANCH

- historical highway design records
- contract inventory management system

RIGHT OF WAY BRANCH

- DOT property management system
- land information system
- project management system

SOME POTENTIAL G I S APPLICATIONS

PLANNING BRANCH (FUNCTIONAL)

- road life study diagrams
- pavement management system
- analytical system for optimum corridor selection
- pavement deterioration based on weather patterns

PLANNING BRANCH (CARTOGRAPHY)

- highway map series
- straight-line diagrams
- urban planning maps
- other mapping

PLANNING BRANCH (MUNICIPAL)

- land information systems for subdivisions

SOME POTENTIAL G I S APPLICATIONS

OTHER

- permit requests and tracking
- policy and standards development
- district office support systems
- contract status reports
- project management systems
- resource deployment
- networking
- etc.

COSTS AND ADVANTAGES OF GIS

FACTORS AFFECTING GIS COSTS

- SCOPE

- SIZE

- DATA

- USERS

SOME ADVANTAGES OF IMPLEMENTING A GIS

- Ease of data retrieval
- Information discovery and display
- Data synthesis
- Digital mapping capabilities
- Modeling
- Reduce data redundancy, Improve data quality
- Improved efficiency & timeliness of analysis
- Broader utilization of data
- Greater interaction of personnel
- Graphic display and customization capabilities

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 17, 1990

A GIS PILOT IN FISHERIES & AQUACULTURE

by

DIANNE NADEAU-HARMON, Fisheries
and
FRED KOLLS, Supply & Services

Introduction by Dianne Nadeau-Harmon

We were approached by the Economic Development Commission last year to look at a possible GIS system. One of the first requirements for a system was to do a needs study.

With this mandate, we contracted Fred Kolls from Supply and Services to perform this task. With no further delay, I would like Fred Kolls to explain in detail this phase.

A GIS PILOT IN

FISHERIES & AQUACULTURE

1.0 INTRODUCTION

Fulfilling the mission of the Department of Fisheries and Aquaculture involves issues whose spatial boundaries encompass far more than the geographic area of New Brunswick. The complexities of these issues has invoked a need for better use of information technologies. Geographic Information Systems (GIS) technology seems to offer some potential for meeting some of the departmental needs. The department does not have a "map making" function in the classic sense. Consequently, it does not have indigenous GIS skilled people. In addition, the department is very dependant on other agencies, particularly the Federal department of fisheries for data used in fulfilling it's mandate.

The departments planning section on information management initiated the thrust to examine GIS technology. It further determined through internal studies that the areas of aquaculture and Gulf herring management should be used in a GIS pilot. The committee recommended a requirements definition study, plus the development of an implementation plan and costing for a GIS pilot. The department requested the assistance of the GIS section of data centre services in performing this study. The study was completed last month.

2.0 THE TWO AREAS FOCUSED ON:

2.1 MANAGEMENT PLANS

Management plans are developed by the Federal Department of Fisheries(DFO) to delineate the use of the fish stocks by various users. These plans are developed annually for each of the different fish stocks. They allocate what amount of species can be harvested within certain areas by what harvesting method and by what province. The federal DFO people involve the Provinces and industry in a consultative approach while evolving these plans. It is New Brunswick's goal to maximize it's share of the allocations.

In presenting it's case during the evolution of the management plans, New Brunswick needs to have access to a wide range of data relative to the entire fishery effort. This includes not only fish species data but also economic and sociologic data. All of this data is spatially related. New Brunswick typically needs to defend an allocation position based on historic allocations within a particular fish stock by a particular region with certain physical and human capability to use that allocation or perhaps to enlarge New Brunswick share. GIS technology is well suited to integrating the diverse sources of data using the spatial component as a key.

2.2 Aquaculture Sites

New Brunswick's aquaculture industry is not just the salmon rearing cages some might be familiar with in the southern part of the province. The entire aquaculture scene encompasses those 50 plus finfish sites as well as 787 shellfish sites, over 50 hatcheries that provide the source stock for the finfish cages, in excess of 2000 trout ponds and numerous weirs. The primary needs within the department is firstly, to know where all these sites are, how big they are and control the licensing and leasing schemes dictated by legislation. Secondly, the department needs to track the impact these sites have on the environment and the conventional fishery as well as knowing how to deal with environmental phenomena that effect these sites like red tides, oil spills and super chill which is super cold water that effectively flash freezes the fish. Clearly, there is a strong spatial component in all the data used to fulfill those needs.

3.0 THE REQUIREMENTS DEFINITION, IMPLEMENTATION & COSTING

The requirements definition for the GIS pilot followed the conventional path of all requirements definition. Interviews were held with many departmental staff. Data was collected on the various legislative acts related to the departments mission. A departmental business model was developed and used to focus the study on GIS specific areas. Process models were developed for the licensing and leasing of fish buyers, processing plants and aquaculture sites. Data models were developed for all the GIS specific facets of the business model. Descriptions, attributes, dimensions and most importantly sources for the data were developed.

A significant amount of attention was devoted to examination of potential data sources for the GIS. This is one aspect of developing a GIS that differs from other type of systems. The sources of data for a GIS can be very varied if the department does not create its own data. For the Fisheries & Aquaculture department, there are four DFO regional offices with HP3000 environments that are **not identical** from which data will need to be acquired frequently. Additionally, data will need to be acquired from the Marine Environmental Data Service (MEDS), Atmospheric Environmental Service (AES), Department of Labour, Department of Commerce and Technology, the Canadian Coast Guard and others. Where there are automated sources, they are definitely not compatible.

The implementation plan that followed, detailed 30 events that were scheduled to require 15 months to complete. Key issues that would impact the plan were identified. The two most important were the establishment of a M.O.U. (Memorandum of Understanding) with each Regional Office of the Federal Department of Fisheries and Oceans on the sharing of data and the human resources needed to staff the pilot study properly.

The last phase of the study developed the costs for the pilot study. Considerable time was spent with vendors verifying the hardware and software configuration. A training matrix was developed to budget for training new and existing staff. All other costs with respect to space and database acquisitions were also included. The percentage breakdown of the costs were as follows:

ITEM	% TOTAL COSTS
HARDWARE PURCHASE	19.8
SOFTWARE PURCHASE	10.6
MAINTENANCE	2.6
TRAINING	7.0
DATABASE ACQUISITIONS	4.3
FRENCH TRANSLATION OF MANUALS	15.3
HUMAN RESOURCING	39.4
PHYSICAL FACILITIES	1.0

4.0 CONCLUSIONS

The Department of Fisheries and Aquaculture GIS is somewhat different than others currently being developed in government. Firstly, the department is not a map maker or user in the classic sense like Natural Resources or Agriculture or Transportation yet most of it's data is spatially related. Unlike those other departments, its domain covers both land and oceans which imparts some interesting demands on the design of a GIS database. Lastly, it does not have a legislated mandate to measure elements within its domain such as Timber Managements for example. The GIS applications were therefore not as obvious as in the departments mentioned above.

The requirements definition study provided the department the opportunity of exploring GIS technology, analyzing where it would be best applied to its mandate and developing some concensus within the staff on how to go about it. The study exposed the key issues of resourcing, organizational structure and data acquisition. At this point, the department is completing a SIP (strategic information plan) and the continuation of the GIS pilot into Phase II will be dependant on funding as well as the overall policy developed as a result of the SIP.

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 17, 1990

CLOSING COMMENTS

by

John Cuthbert
Director, Marketing Services
Supply & Services

The content of the agenda of the agenda over the last couple of days has been fairly heavy, that coupled with the fact that all of the speakers that have proceeded me have been accomplished, and knowledgeable, would indicate that brevity is in order for me, so brief I'm going to be; however, to stand at this little podium I'm reminded of a story of a preacher who had been anything but brief, for some three hours had been regaling his audience of the horrors of alcoholic beverage and the consumption thereof. To illustrate a point he had on the podium a container of spring water, and a container of scotch whiskey. He took a little worm, and he dropped it into the water and it splashed around and swam and had a great time. Just as it was really enjoying itself he picked it up and dropped it in the whiskey and it shuddered and died - dead. The preacher said *"what does that prove to you?"*. A drunk who had entered stood up and said, it tells me, *"that if I drink lots of whiskey, I'll never have worms"*. Nothing to do with technology, but it's a good ice breaker.

We've really been delighted this past couple of days with the attendance, we have been delighted with the quality of the speakers, and with the quality of the presentations, and with you the audience for your attention and interest you have shown to the subjects that have been presented.

The organizing committee, I think, are to be congratulated for pulling all of this together, because as you can imagine it is difficult to arrange a conference of this nature to maintain a balance of content, to suit an audience mix as we have had over the last couple of days, so to Dave Cowperthwaite who was the conference chairman, Myrna Tweedie, Brenda Colpitts, Gary Fraser and Jean-Serge Maillet and to Bob Wade who has been sitting over here for two days twisting knobs, and recording all of this for posterity, I think you join with me in congratulating them.

This is our eighth conference, and every year we hear of new developments and technologies and to me it becomes very confusing, I don't know how you feel, I don't know how to describe this crazy segment of industry that we find ourselves in other than to leave you with another little story.

A young fellow who had graduated some ten years previously, went back to visit his old professor. The professor was delighted to see him and said, *"Bill would you like to look at the questions that I'm scheduling for this year's graduating class"*, and Bill said *"I'd be delighted"*, so he did. He looked at him very seriously, and said, *"I think these are the same questions that you gave me in my finals some ten years"*. *"Of course"*, he said, *"you never change the questions, only the answers"*. I think that sums up it up, because for longer than I care to admit, I've heard the same questions for many, many years, and the only things that have changed are the answers, and no doubt when we have the ninth conference here, hopefully next year, we will see another set of answers with solutions to these questions that we have all been asking.